SIEMENS

SIMATIC 505

Controllers

Catalog ST 40

efesotomasyon.com

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Introduction

1

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Shortcut to savings.

Upgrade to 505 SoftShop™ for Windows® and download improved productivity, efficiency and performance.

1

Some decisions are intuitive.

Menu-driven commands for all types of programming tasks. Real shortcuts. Tool bars. Cut and paste. Point-and-click.

Introducing the real Windows operating system for programing Siemens SIMATIC® 505 series controllers.

The benefits are easy to see.

Import your existing TISOFT® program files. *505 SoftShop* for Windows supports the full family of processors and their programming instructions. Includes 520/525/530/535/545/555/560/565/575 controllers.

Valuable characters.

505 SoftShop features a totally customizable documentation window that provides instant access to the symbol/label/comment editor. Now you can read and change information faster, with virtually unlimited character capacity.

Optimize productivity by optimizing your environment.

User interfaces and displays can be completely customized by each user. Tailor the logic display, dialog boxes and text format to create your preferred on-screen arrangement.

There's always help…on-line.

505 SoftShop for Windows eliminates the need for bulky manuals. Click on context-sensitive assistance the moment you have a question using the on-line help menu. All the support you need is literally at your fingertips. The entire user manual is just a keystroke or two away.

Take SoftShop for a test drive.

Download a trial version of the software from our website on the Internet at www.aut.siemens.com/505

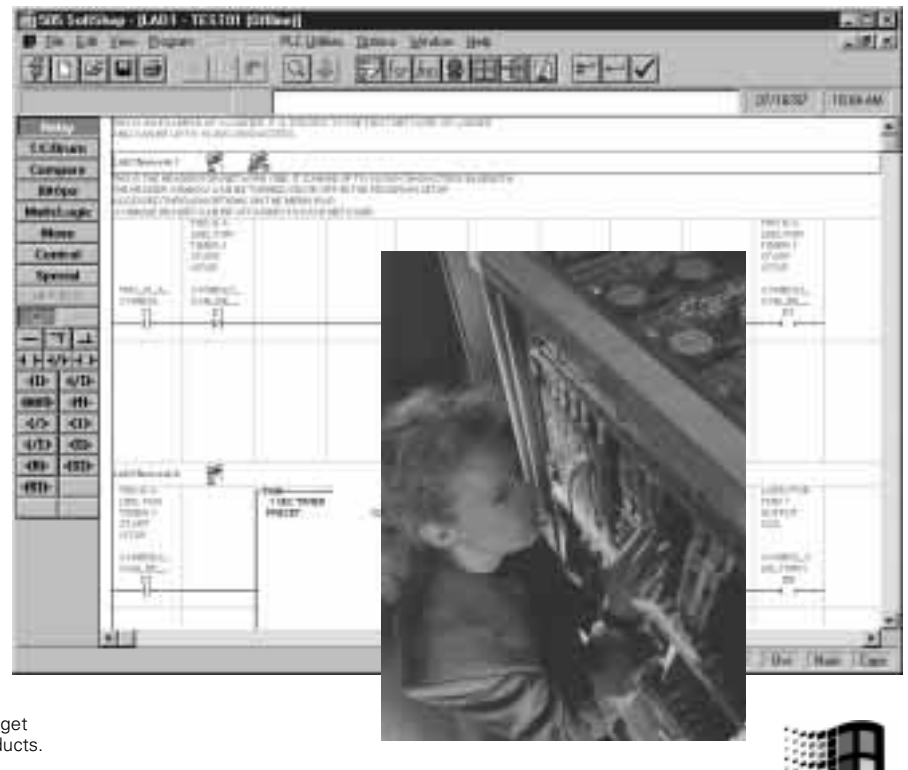
The new *505 SoftShop* simplifies all your programming activities with familiar Windows features and icons that make data entry and routine functions become just that – routine.

TOOLBAR configurations are simplified with views that automatically change depending on CPU capacity and programming application.

And point-and-click options allow you to view multiple data windows, insert sections of logic and validate logic already entered.

It's the logical thing to do.

An exclusive REWIRE command lets you renumber all addresses simultaneously by copying logic and symbols to a clipboard. You can shorten development time by re-addressing portions of logic in the clipboard and validating them before pasting new routines back into the program.



Visit our website at www.aut.sea.siemens.com to get the latest information on Siemens automation products.

MICROSOFT® WINDOWS™ COMPATIBLE

At Siemens we are committed to helping you solve your total plant control problems, not just in the areas traditionally assigned to programmable controllers but also in process control applications and in plant supervision.

Since all plants are not created equal, we offer a family of compatible process and programmable controllers, human-machine interfaces and supervisory systems which let you select just the elements you need to solve your automation problem one step at a time.

The keystone of this distributed approach is ease-of-use. By applying the latest in high technology hardware and software to each control element, Siemens has made plant control easier to design, install and maintain, leaving you more time to concentrate on your process.

Programmable Controllers

The SIMATIC 505 line offers the best of two types of controllers. **Classical programmable logic controllers (PLCs)**, designed to handle typical upstream and down-stream applications like material handling, palletizing and packaging; and **advanced controllers** which provide a unique combination of analog loop control, automated loop tuning, advanced mathematical functions and high-speed sequential control to handle the process part of your plant.

The SIMATIC 505 provides a single I/O structure and programming language so that you can expand easily. Training is minimized and spare parts holding optimized.

Intelligent I/O modules

For many special functions, processing power is distributed even further, to intelligent I/O modules. These are used to handle devices like bar-code readers or servo drives easily without impacting the controller's response time.

Human-machine interfaces

From simple timer/counter access modules to sophisticated color graphics systems, we offer a complete range of industrially hardened human-machine interfaces (HMI).

NETworking

With the various machine and process control functions handled by the controllers themselves, Industrial Ethernet and PROFIBUS can be used to network the individual controllers to a central supervisory computer or a central controller.

Industrial Ethernet is a protocol that runs on a standard 10Mbit Industrial Ethernet network and offers both peer-to-peer and host services.

Industrial Ethernet TCP/IP is a protocol that runs on a standard, 10Mbit Ethernet network and offers both client and server services.

In applications where product movement is involved, it is often necessary to synchronize the operation of several PLCs.

The high speed inter-PLC communication required to do this is handled by PROFIBUS-FMS.

PROFIBUS-FMS (Field Messaging Specification) Is a protocol that uses the PROFIBUS open standard 12 Mbaud network to provide peer-to-peer communication between PROFIBUS Masters.

In a time of decentralizing processes, PROFIBUS-DP takes over the job of collecting distributed I/O information as the fastest Fieldbus system. For sensor/push button functions, you can choose the Actuator-Sensor-Interface (AS-i).

PROFIBUS-DP is a protocol that runs at 12Mbit and provides an open standard for remote I/O.

PROFIBUS-DP I/O

SIMATIC 505 was the first major PLC to offer a built-in connection to PROFIBUS-DP I/O at 12Mbit operation. Since PROFIBUS-DP is an open standard for remote I/O, PROFIBUS Part 3 compliant slaves from all Siemens PLC lines as well as third-party suppliers can now be connected to SIMATIC 505 PLCs.

SIMATIC 505: Open to the future

If you've ever been frustrated by the lack of solutions available from proprietary I/O or closed networks, it's time you took a closer look at the SIMATIC® 505 family of controllers. Developed in response to the ever growing need for open standards and better connectivity, SIMATIC 505 controllers support a complete networking solution, from sensors to Management Information Systems (MIS). Optimized top-bottom connectivity allows you to select a networking implementation which best suits your manufacturing requirements.

For the high end of your automation needs, SIMATIC 505 controllers provide connectivity to industry-standard Ethernet. SIMATIC 505 is fully compliant with IEEE 802.3 standards, which considerably reduces time spent on commissioning, training and maintenance. As the most widely implemented management level communications technology today, Ethernet has been proven in thousands of manufacturing and office applications throughout the world. The SIMATIC 505 Control System supports both the TCP/IP and ISO/MMS protocols, assuring you of internationally supported connectivity options. By offering the most EMI reliable and durable network components, we enable your Ethernet Communications to work in an industrial enviroment (i.e. Industrial Ethernet). But that's not all...SIMATIC 505 controllers have expanded their global connectivity with the innovation of an integrated PROFIBUS-DP port as well as with an available PROFIBUS-FMS board.

PROFIBUS is an internationally accepted standard adopted by hundreds of leading manufacturers around the world, and is readily accepted as the open architecture solution of the future. With a remarkable 12 Mbaud communication speed, PROFIBUS enables peer-to-peer communication (FMS) and gives remote I/O the same performance of local I/O (DP), and with PROFIBUS, you're not tied down to a single type or one manufacturer's offering of I/O.

PROFIBUS-PA

PROFIBUS-PA is the communications-compatible extension of PROFIBUS-DP to include a transmission system which allows applications in the hazardous area. The transmission system of PROFIBUS-PA complies with international standard IEC 1158-2.

PROFIBUS-PA allows transducers and actuators in the hazardous area to communicate with the automation system over great distances. With PROFIBUS-PA, the field devices are also powered via the data cable.

Modern field devices from production technology and the process industry have, in addition to the measured value and manipulated variable, many parameters; these must be changed during startup and operation, for example, to optimize the interface to the measured value sensor. In addition to the previous cyclic services, acyclic services were therefore introduced with PROFIBUS-PA; these allow the changing of parameters of the devices during operation. In cyclic data communication, all output values (control commands) are written into field devices, and all input values (measured values) are read out of the field devices. The procedure is so far the same as with PROFIBUS-DP. An additional acyclic message can then be sent to read the settings of the field devices or change parameters.

The programmable controller or the PLC in which the open and closed-loop control functions are executed, has full access to the field devices via cyclic and acyclic messages.

The configuring station or PC can communicate with the field devices only via acyclic services. If necessary, the configuring station can write parameters into the field devices via acyclic messages, or read diagnostic data.

The two network components **DP/PA coupler** and **DP/PA link** are available for the transition from the PROFIBUS-DP (RS-485) to the PROFIBUS-PA (IEC 1158-2) transmission system. Their use is governed by the automation requirements.

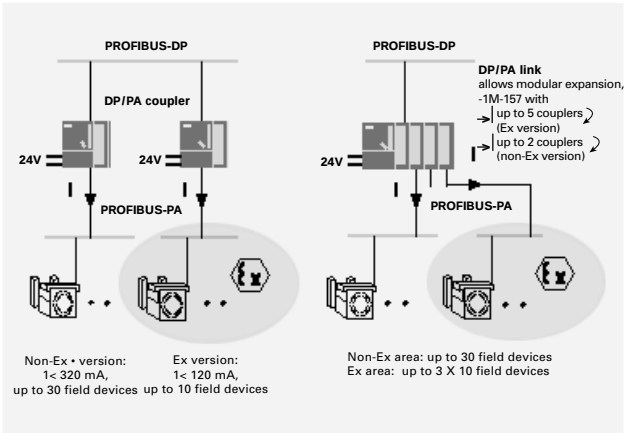


Figure 1/1 System configuration

Prepared for the future: A distributed I/O integration platform

One of the most important control trends today is the use of a controller as a distributed I/O integration platform – whether your application calls for rack, modular, block or third-party I/O, or the SIMATIC S5, S7 or 505 controllers, the open protocol of PROFIBUS-DP makes the best solution easy.

PROFIBUS-DP also enables you to integrate a wider variety of automation products than ever before. Now drives, valves, weigh scales and more- from both Siemens and third parties - can be integrated into your control schemes far easier than ever before.

You also have direct connectivity to AS-i at the sensor/actuator level from PROFIBUS. By simply incorporating the AS-i Link Module, you're able to take advantage of AS-i's inherent labor, installation and maintenance savings and give yourself more I/O choices. Plus, its high-speed transmission capabilities make AS-i the perfect solution for an environmentally hardened, high-performance network at the sensor/actuator level. And as with PROFIBUS, AS-i is an open technology, so you're able to incorporate solutions from Siemens as well as third parties.

Together, these features add up to a distributed I/O integration platform that's hard to beat now and in the future.

Savings you can count on

When compared to a traditional hard-wired 4-20 mA system, the proven labor, installation and maintenance savings of standard networks is remarkable. For example, an actual installation has demonstrated that a 2,500 foot hard-wiring run can be reduced to 520 feet with an 81% savings in wire, a 60% savings in screw terminals and a 50% savings in I/O cards *

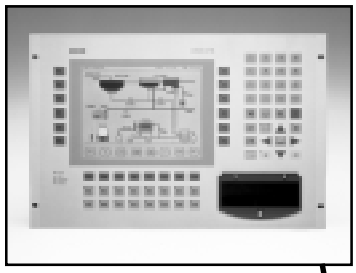
And thanks to the combination of fewer terminations, a less complicated system and the system's ability to identify and locate problems, maintenance and troubleshooting are far easier to accomplish.

**Excerpted from Control Engineering, May 1996*
© Cahners Publishing

Open solutions
Unlimited choices

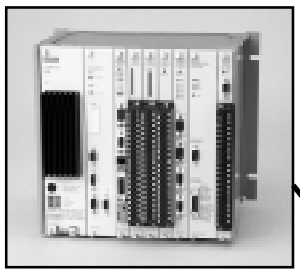
As a distributed I/O integration platform, SIMATIC 505 controllers with SIMATIC NET (SINEC®) PROFIBUS provide the vendor independent network lines between SIMATIC NET Industrial Ethernet at the upper and medium automation levels; SIMATIC NET PROFIBUS for PLCs, drives, valves and computers at the cell and field levels; and SIMATIC NET AS-i at the sensor/ actuator level. These networks operate together in perfect coordination and provide for the complete interconnection of your plant.

Figure 1/2

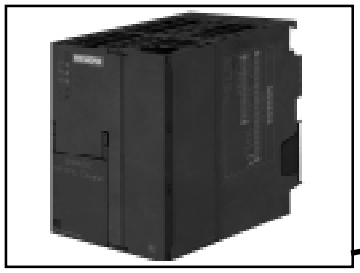


Human-Machine Interface (HMI)

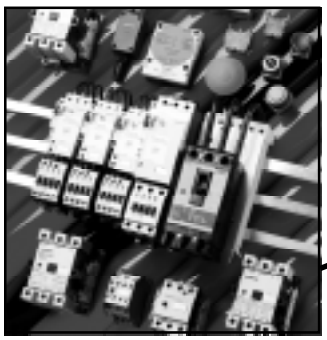
Drives (MICRO MASTER®)



Rack I/O (505 Remote I/O)

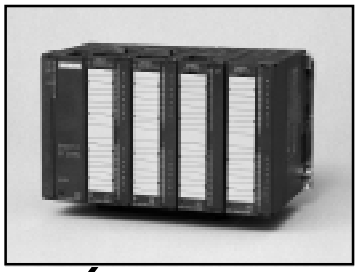


DP-PA Coupler



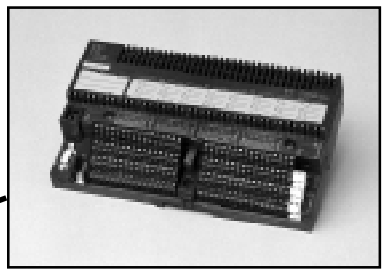
Sensor/Actuator Direct Connection (AS-i)

Supervisory Control (SIMATIC PCS:
Process Control System)



Modular I/O (E 200M)

Industrial Ethernet (TF or TCP/IP)



Block I/O (ET 200B)

PROFIBUS

SIMATIC S7 Family of Controllers
(S7-200, 300, 400)

AS-Interface (AS-i)

Data Transfer (DP/AS-I Link)

SIMATIC 505:

The controller for all control functions

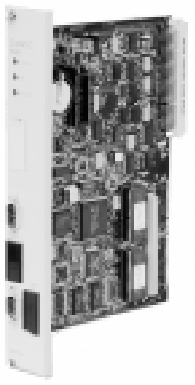


Figure 1/3 SIMATIC 545

You know the story all too well; increasing competitive pressure and more demanding control strategies make choosing the right automation control system more important, and challenging, than ever. Today, it's no longer feasible to have different controllers for different applications. Flexibility is as important in automation control as capability. And no product exemplifies those traits better than the SIMATIC 505 family of advanced controllers from Siemens.

Over the years, continuous product development has kept the entire 505 family at the forefront of control technology. From their unique ability to handle both process and discrete control applications with equal competency, to the open connectivity of their standard PROFIBUS network, SIMATIC 505 controllers can help you stay ahead of your competition.

Outstanding performance over a broad range of applications

Far more than a PLC, the 505 family of advanced controllers, including the SIMATIC 545, 555 and the 575, are equally adept at meeting your most demanding control needs. Without compromising affordability, 505 controllers feature such high-performance capabilities as the largest mid-range memory and the fastest scan time available. New generation 555 controllers will soon be the first PLC to offer built-in auto loop tuning. So they'll easily handle both large process programs and high-performance machinery.

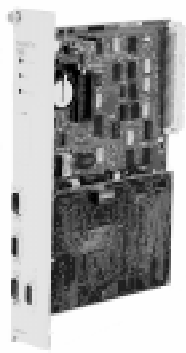


Figure 1/4 SIMATIC 555

Powerful process control solutions

The SIMATIC family of controllers became the world's largest selling line of PLCs by delivering performance that exceeds expectations. SIMATIC 505 continues that tradition by providing sophisticated process control in a PLC-familiar platform. Built-in control for continuous, batch and discrete control applications is also provided as standard. Plus, a comprehensive selection of pre-programmed PID algorithms make sophisticated, closed-loop programming a snap.

Each PID loop is capable of multiple alarm functions to warn operators of out-of-limit conditions, or to automatically initiate corrective action.

The 505 CPUs can even alert you with an alarm that warns of a broken transmitter, a feature unique in its field.

Discrete control that's built for speed

First and foremost, SIMATIC 505 controllers are designed to be fast. To handle your sequential control needs, SIMATIC 505 CPUs will execute 1000 words of Boolean logic in as fast as 0.068ms/K - fast even by specialized controller standards. Combine our exceptional scan time performance with your choice of specialized interrupt handling modules or high-speed analog modules and you get system response times that are more than comparable to dedicated machine controllers.

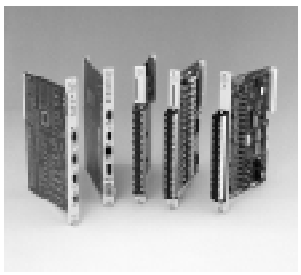


Figure 1/5

Recently introduced I/O devices include a Communication Port Expander, PROFIBUS-FMS interface, TCP/IP Ethernet adapter, 120 VAC Isolated Input & Output modules and a 16-Point Differential Analog, Thermocouple and RTD Inputs with more devices planned in the future.

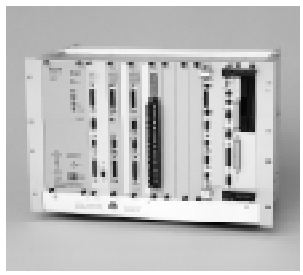


Figure 1/6 SIMATIC 575: Advanced VME Controller

Advanced programming made simple

Whatever your need, closed-loop PID control, floating point math, advanced mathematical functions, or simplified process programming through high-level languages - the entire SIMATIC 505 family of controllers greatly simplifies your solutions. It all starts with a comprehensive selection of available software tools, including TISOFT with special function programming, SoftShop Windows-based programming, SIMATIC APT for advanced process control, Ethernet for easy third-party human-machine interface integration and the WinCC® Integrated Human/ Machine Interface.

Built-in loops and alarms make programming a simple matter of plugging in critical values in a menu. After entering those values, the CPU handles all the calculations for you, saving you considerable time, training and money.

Technical specifications

CPU	SIMATIC 545	SIMATIC 555	SIMATIC 575
User memory	96-192 Kbytes	384—1800 Kbytes	832-1800 Kbytes
Boolean scan time	.33-0.16 ms/K	0.07 ms/K	0.09-0.45 ms/K
Digital I/O points	1024-2048	8192	8192[1]
Analog I/O points	1024	8192	8192[1]
Timers/counters	1024-4096	20480	20480
Control relays	4096-32768	32768	23552
Arithmetic	+, -, x, ÷, TRIG	+, -, x, ÷ TRIG	+, -, x, ÷ TRIG
PID Loops	16-64	64-256	64
Local I/O	Series 505	Series 505	VME
Series 505 remote I/O	0-15 bases	15 bases	16 bases[1]
PROFIBUS-DP I/O [2]	32[4] - 112 devices	112 devices	112 devices[3]
Communications	Ethernet -	Ethernet —	Ethernet —
	TCP/IP & MMS	TCP/IP & MMS	TCP/IP[2] & MMS
	TIWAY	TIWAY	TIWAY
	Modbus™	Modbus	Modbus[1]
	PROFIBUS-DP & FMS	PROFIBUS-DP & FMS	PROFIBUS-DP & FMS[1]
	AS-I	AS-I	AS-I
Local communication Ports	1 RS-232	1RS-232	1RS-232
	1 RS-232/422/485	1RS-232/422/485	1RS-232/422/485
Multiprocessor	No	No	Yes

[1]Requires optional Series 505 Remote I/O card

[2]The number of devices or stations supported includes both master and slaves

[3]Requires optional PROFIBUS DP I/O annex card on some models

The latest technology

A flexible integration platform for the toughest problems

Whether your application calls for motion control, real-time data, an embedded PC, machine vision, inspection or even a specialty I/O device, the SIMATIC 575 holds the key to your best selection of solutions. To begin with, the 575 combines the open protocol of PROFIBUS-DP with high-speed VME backplane data sharing. This advanced capability allows for multiple CPUs and third-party local base cards. In short, it's the integration platform that brings it all together: virtually any command, any time, on-the-fly.

For added performance, you may choose from specific task-oriented I/O modules and/or a multi-processing approach. The 575's multi-processing capability allows segmentation of your process while maintaining total integration over the VME backplane. Whatever your need, at whatever the level, the SIMATIC 575 with VME and PROFIBUS-DP is the ultimate open platform.

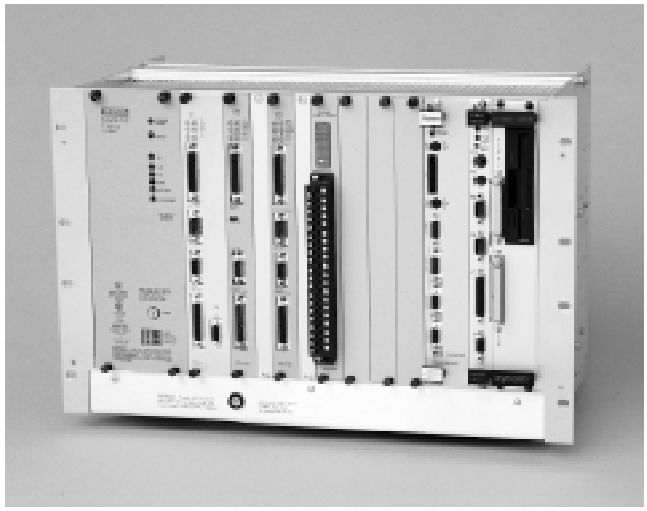


Figure 1/7 SIMATIC 575 VME Controller

SoftShop™

Application

505 SoftShop™ is a complete Windows 3.1®, NT® and 95® programming, documentation and trouble-shooting package for use with all 525/535/545/555/565/575 Programmable Controllers as well as all older 500 series models. Supports all CPU instructions and functions.

Design

SoftShop gives first-time users the familiar, easy to use Windows environment to get up to speed fast, while giving experienced programmers easy access to a wealth of powerful features the SIMATIC 505 is famous for. This new package has all the features you have come to expect from a Windows application, such as toolbar instruction picks, cut & paste, customized screen displays and customized printing. It also includes the latest programming innovations like symbolic programming, “intelligent” cut & paste with “rewire,” totally configurable program annotation & documentation capability and last, but not least, simultaneous display of multiple configurable data (status) windows.

For our existing users, SoftShop will read files in TISOFT format to make transition easier.

SoftShop contains extensive, context sensitive on-line help and a complete manual.

SoftShop offers programming over Ethernet, TIWAY and PROFIBUS-FMS.

SoftShop allows remote programming across TCP/IP Ethernet PLC nodes.

SIMATIC APT (Application Productivity Tool)

Application

SIMATIC® APT™ (Application Productivity Tool) is an integrated control system design environment that uses computer aided software engineering (CASE) technology to provide an object-oriented design environment for the SIMATIC programmable controllers. APT also provides a link between the individual controllers and their logical representation in the SIMATIC PCS data base. The package runs on any of Siemens family of industrial programmers or any IBM PC AT/XT or compatible PC.

Design

SIMATIC APT provides a natural means of mapping the physical process into the control system. It encourages the partitioning of the plant processes into a hierarchical structure which is easier to understand and implement.

APT uses a graphical approach to design. GRAFCET techniques are used for developing sequential logic. APT also has a graphical representation for continuous control processes based on the SAMA[1] standard. Development of lower-level control actions are simplified by using a library of devices and continuous function blocks that include internal interlocks and comprehensive auxiliary information.

Separate safe-state sequential function charts (SFC) provide alternate control action for emergency situations. The safe-state SFCs have flexible return-to-normal paths to match the process operating procedures. Extensive validation functions are included to quickly trap invalid and missing configurations. MAITT, a test language interpreter, is included for writing tests and validating control logic.

The principal features are:

- Supports sequential, continuous, safe-state, parallel batch control strategies and process partitioning;
- Integrates application design development, testing, documentation and maintenance;
- Windowing, split-screens, pull-down help screens, embedded algorithms, and fill-in-the-blank forms;
- Sequential function chart (SFC) and continuous function chart (CFC) graphics-based languages;
- State control and math text-based languages;
- Multiple main and subordinate safe-state SFCs with priority levels;
- Libraries of standard control algorithms.

[1]SAMA = Scientific Apparatus Manufacturers Association.

TISOFT

Application

TISOFT is a complete programming documentation and troubleshooting package for use with SIMATIC 505 programmable controllers. The package runs on any of the Siemens family of industrial programmers PG or any IBM PC AT/XT or compatible PC using MS DOS or Windows 3.1 operating system.

Design

TISOFT is designed for easy use without sacrificing the time-saving features that are so vitally important to experienced system programmers. From menu-driven screens to extensive on-line help utilities, TISOFT provides the tools that are needed to help you quickly and easily enter and document PLC programs. Maintenance personnel who make changes on the factory floor will find TISOFT easy to use. Configurable maintenance charts and advanced troubleshooting aids help you monitor and control the machine process after the automation project is complete.

As your control needs expand, you may find the need to use other members of our programmable control family. TISOFT maintains the same appearance and ease-of-use for all of our controllers, so retraining is not required.

The software is delivered with extensive documentation.

Human-Machine Interface

SIMATIC Human-machine interface devices (HMI)

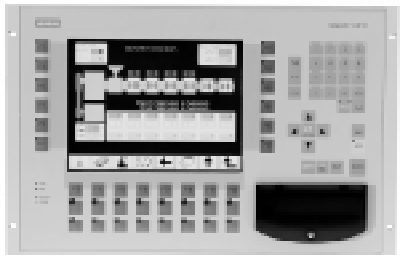
Clarity and convenience

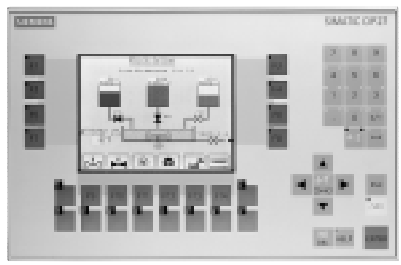
HMI systems are becoming increasingly important for all levels of control operation.

SIMATIC operates hand-in-hand with the HMI family in this field of application.

The HMI system requests the process data needed for its configured displays from the SIMATIC programmable controller. The data are transferred automatically; no SIMATIC programming overhead is required.

The SIMATIC HMI operator panel is configured using SIMATIC ProTool or SIMATIC ProTool/Lite configuration software under Windows. Consistent application of the WYSIWYG principals (“what you see is what you get”) unambiguous icons and drop-down menus lend the software an easy-to-follow display layout which cuts programming and configuration time drastically. The integrated system of on-line helps, plus the index and search functions further simplify operation.





Quality

Quality

Quality is at the center of everything we do!

Meticulous attention to detail and continuous monitoring are necessary on a daily basis to produce SIMATIC products of the quality that you, the user, have come to expect.

Our quality management system assures that all of our employees achieve an optimum level of quality in their respective areas of responsibility.

Our quality management system completely fulfills the requirements of the DIN ISO 9001 standard (identical to EN 29 001 and ISO 9001).

The certificates are available in several languages.

DIN ISO 9001 includes areas such as responsibility, the quality assurance system, contract review, design control, document control, purchasing, identification and traceability, process control, inspections, inspection media, inspection status, handling of defective products, correction measures, materials handling, stocking, packaging and dispatch.

505 System CE Declaration of Conformity

Manufacturer's Name: Siemens Industrial Automation, Inc.
Manufacturer's Address: 3000 Bill Garland Road
Johnson City, TN 37601

Manufacturer's Agent: Siemens AG
Automation Engineering Department – AUT 125
Postfach 1963
D-92209 Amberg, Germany

declares that the product:
Product Name: SIMATIC 505 System

Model Numbers:

505-ATM-4120	555-1103	505-3516	505-4216-A	505-4516	505-4916	505-5518	505-6516	505-7016 505-7028
505-CP-1434TF	555-1104	505-3532	505-4232-A	505-4532	505-4932	505-6010	505-6660	505-7038
525-1102	555-1105	505-3708	505-4308	505-4608	505-4908-A	505-6011	505-6660-A	505-7101
525-1104	555-1106	505-3716	505-4316-A	505-4616	505-4916-A	505-6108-A	505-6663	505-7190
535-1212	505-2571	505-3732	505-4317	505-4632	505-4932-A	505-6202	505-6830	505-7201
545-1101	505-2555-A	505-4008-A	505-4319	505-4708	505-5100	505-6204	505-6840	505-7202
545-1102	505-2556	505-4016-A	505-4332	505-4716	505-5103	505-6208-A	505-6850-A	505-7339
545-1103	505-2557	505-4032-A	505-4408	505-4732	505-5184	505-6308	505-6851-A	505-7340
545-1104	505-2580	505-4108	505-4408-A	505-4808	505-5190	505-6408	505-6860	505-7354
545-1111	505-2590-A	505-4116	505-4416-A	505-4816	505-5417	505-6504	505-7002	505-7510
555-1101	505-CP2572	505-4132	505-4432-A	505-4832	505-CP5434-FMS	505-6508	505-7003	505-9201
555-1102	505-3508	505-4208-A	505-4508	505-4908	505-CP5434-DP	505-6511	505-7012	505-9202

complies with
EMC Directive: **EN55011: 1991 Class A**
EN 50082-2: 1995

The products listed above comply with the requirements of the EMC Directive 89/336/EEC intended for use in industrial environments when installed in accordance with User Manual specifications and when installed in a grounded NEMA 12 or better metal cabinet.

SIMATIC PCS

SIMATIC® PCS™ is an integrated family of products that provide a global solution at all levels of process automation, including plant operations, plantwide communications, engineering, control, and field I/O.

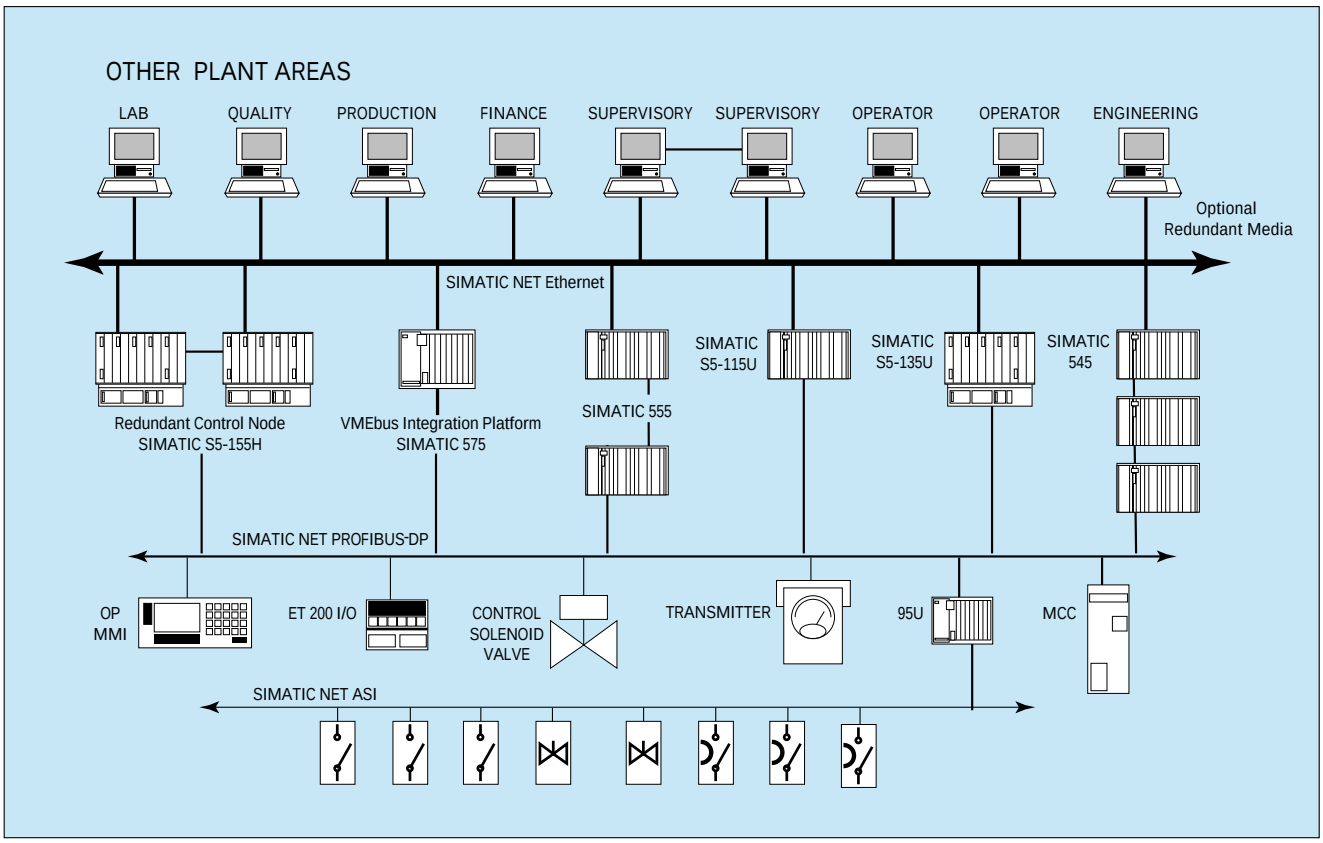


Figure 1/8 System Architecture

505 System

2

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Introduction

Introduction

The SIMATIC 505 control systems are highly compact. We have used the latest Application Specific Integrated Circuits (ASIC) design and surface mounting technology to place more control in less space than ever. This reduces panel space and system costs, and at the same time increases reliability. The SIMATIC 505 control systems are built-in double Eurocard format and supplied in three DIN standard rack (base) sizes.

There are three types of SIMATIC 505 controllers:

- Classic, all discrete-oriented controllers - the SIMATIC 525 and 535
- Process control-oriented controllers - the SIMATIC 545 and 555.
- Integration platforms- the SIMATIC 575.

The 545 “Lite” is intended for small to medium- sized applications requiring discrete and analog control. Large discrete applications can be handled by the 545. For more complex or process control applications there is the 555. This top of the range controller is equipped to handle special mathematical functions, PID loops, alarms and high-level language programs. The 545 is also designed to handle complex process control applications, but of smaller dimensions. The 575 controller facilitates multi-vendor, multi-controller solutions.

The SIMATIC 505 controllers are supported by a complete range of digital, analog and intelligent I/O modules thereby optimizing the handling of thermocouples, RTD inputs, high-speed and special devices. The analog I/O modules are galvanically isolated . The SIMATIC 505 controllers communicate to the remote or distributed I/O racks (bases) using a 1 Mbps coaxial or twisted-pair cable. As a result, I/O racks (bases) can be located up to 4000 m (15,000 ft.) from the controller, eliminating the need for multiple cable runs and reducing installation costs.

In addition, the SIMATIC 505 controllers provide built-in support for the 12 MBaud PROFIBUS-DP Type I/O, which is the new open standard for remote I/O. This provides connectivity to I/O from other SIMATIC product lines as well as to Siemens drives and third-party I/O.

PROFIBUS-DP Slaves can be located up to 1200 meters from the controller when operating at 9.6 Kbaud or up to 100 meters at 12 Mbaud (even greater distances with fiber optic cable).

Note: For cabling, connectors, repeaters and other hardware components for PROFIBUS-DP, see Siemens IK 10 catalog under PROFIBUS sections.

General technical specifications

Safety and reliability

The SIMATIC 505 family uses the IEC 65A and DIN 41494 design standards for industry and process control equipment.

Insulation

Standard IEC 801, Part 2, Level 4. Ensures that the product is protected against the discharge of static electricity to15 kV.

Temperature cycle

Standard IEC 68-2-14 Nb. Ensures the product can operate in changing ambient temperatures from 0 to 60 ˚C.

Humidity

Standard IEC 68-2-3 Ca. Ensures that the product can operate in environmental conditions of 95% relative humidity (non-condensing) of 60 ˚C.

Mechanical shock test

Standard IEC 68-2-27 Ea. Ensures that the product is immune to non-repetitive shocks likely to be encountered during service.

Controllers: Specifications and Ordering Information

Specifications

SIMATIC 505 controllers can be divided into three types:

- **Classical programmable controllers** designed to handle typical upstream and downstream applications like material handling, palletizing and packaging.
- **Advanced controllers** which provide a unique combination of analog loop control, advanced mathematics functions and high-speed sequential control, to handle the process part of your plant.
- **Integration platforms** designed to enable mixed vendor VME solutions.

All types are compatible in their I/O structure and programming language so that you can expand easily. Training is minimized and spare parts holding optimized.

- **PowerMath™ Coprocessor** (available soon) built-in floating point math coprocessor does high-level math up to 150 times faster than our previous 555 controllers
- **SmarTune™ Auto loop tuning** (available soon) Providing integrated automatic tuning of PID loops.

NEW!

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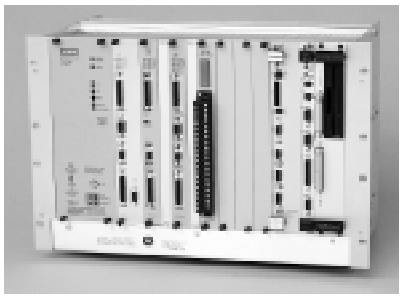
Technical Specifications

CPU	SIMATIC 545	SIMATIC 545	SIMATIC 555	SIMATIC 555
PPX:	**545-1103**	**545-1104**	**555-1103/1104**	**555-1105/1106**
Main memory for program and data (2 bytes = 1 statement) Max EPROM / EEPROM size	96 Kbytes RAM/ EPROM 96 / 0 Kbytes	192 Kbytes RAM/ EPROM 192 / 0 Kbytes	384 /1920 Kbytes RAM/ EPROM 256 / 0 Kbytes	384 /1800 Kbytes RAM/ EPROM/EEPROM 256 /1800 Kbytes
Memory Configuration				
Total Kbytes	96	192	384 / 1920	384/1800
Ladder Program Kbytes	30	59	123 / 635	123 / 600
Execution time per 1024K binary statements	0.33 ms	0.16 ms	0.07	0.07
Control relays	4096	32768	32768	32768
Non retentive	3072	28671	28671	28671
Retentive control relays	1024	4096	4096	4096
505 Remote I/O Channel bases	–	15	15	15
PROFIBUS-DP I/O slaves	32[1]	112	112	112
PID loop				
Number of standard loops	16	64	64	128
Calculation rate loops/100ms	32	37	50	50
Number Fast Loops (5ms)	0	0	0	128
SmarTune™ PID Loops	0	0	0	256
Arithmetic functions	+, -, x, ÷	+, -, x, ÷ trig. functions	+, -, x, ÷ trig. functions	+, -, x, ÷ trig. functions
Digital inputs/outputs	1024	2048	8192	8192
Analog input/outputs	1024	1024	8192	8192
Intelligent I/O modules	yes	yes	yes	yes
Remote rack distance	1000 m / 4000 m	1000 m / 4000 m	1000/4000 m	1000/4000 m
Networking	Industrial Ethernet & TCIP/IP TIWAY, MODBUS, PROFIBUS-DP[1] & FMS	Industrial Ethernet & TCIP/IP TIWAY, MODBUS, PROFIBUS-DP & FMS	Industrial Ethernet & TCIP/IP TIWAY, MODBUS, PROFIBUS-DP & FMS	Industrial Ethernet & TCIP/IP TIWAY, MODBUS, PROFIBUS-DP & FMS
Total PID loops	16	64	64	256
Analog alarm blocks	32	128	128	512
Special function programs	64	1023	1023	1023
PowerMath™ Coprocessor[2]	no	no	no	yes

[1]with optional PROFIBUS-DP I/O annex board
[2]built-in floating point math-coprocessor enables math calculations to be 5 to 10 times faster than prior versions.

Controllers, Specifications and Ordering Information (continued)



NEW!

Technical Specifications

CPU	SIMATIC 575	SIMATIC 575	SIMATIC 575
PPX:	**575-2104**	**575-2105**	**575-2106**
Main memory for program and data (2 bytes = 1 statement)	832 Kbytes RAM	832 Kbytes RAM	1856 Kbytes RAM
Memory Configuration			
Total Kbytes	832	832	1856
Ladder Program Kbytes	272	272	610
Execution time per 1024K binary statements	0.9 ms	0.45 ms	0.45 ms
Control relays	23552	23552	23552
Non retentive	19455	19455	19455
Retentive control relays	4096	4096	4096
505 Remote I/O Channel bases	15	15	15
PROFIBUS DP Slaves	112[1]	112[1]	112[1]
PID loop			
Number	64	64	64
Calculation rate loops/100ms	37	50	50
Arithmetic functions	+, -, x, ÷	+, -, x, ÷	+, -, x, ÷
trig. functions	trig. functions	trig. functions	trig. functions
Digital inputs/outputs 8192	8192	8192	8192
Analog input/outputs 8192	8192	8192	8192
Intelligent I/O modules	yes	yes	yes
Remote rack distance 1000/4000m	1000/4000m	1000/4000m	1000/4000m
PCS Supervisory System	yes	yes	yes
Networking	Industrial Ethernet & TCP/IP TIWAY, MODBUS, PROFIBUS[1]-DP ,FMS	Industrial Ethernet & TCP/IP TIWAY, MODBUS, PROFIBUS[1]-DP ,FMS	Industrial Ethernet & TCP/IP TIWAY, MODBUS, PROFIBUS[1]-DP ,FMS
PID loops	64	64	64
Analog alarm blocks	128	128	128
Special function programs	1023	1023	1023
PowerMath™ Coprocessor[2]	no	yes	yes

[1] 575 can have either an optional 505 remote I/O channel annex card PPX: 575-2126 or a PROFIBUS-DP annex card PPX: 505-CP-5434-DP, but not both.

[2] Built in floating point math coprocessor enables math calculations to be 5 to 10 times faster than prior versions

There are four types of I/O communication techniques for connecting 505 controllers to their I/O:

- Distributed I/O connection
- Remote I/O connection
- PROFIBUS-DP connection
- AS-i actuator-sensor bus connection

Distributed I/O connection

This technique is only used by the 535 PLC. The Distributed I/O communications system consists of two modules:

- I/O channel controller (IOCC) (PPX:505-6830)
- Distributed Base Controller (DBC) (PPX:505-6840)

The IOCC is installed in the SIMATIC 535 local base. The DBC is installed in the distributed base. Up to 14 DBCs can be connected in a daisy chain configuration. The last DBC can be located up to 396m (1300 ft.) away from the IOCC.

Remote I/O connection

This technique is used by the 545/555/575 PLCs. The remote I/O communications system consists of two modules:

- Remote channel controller (RCC)
- Remote base controller (RBC)

Remote channel controller

The RCC controls all communications between the 545/555/575 PLCs and their remote I/O bases.

- The 545/555/575 PLC has the RCC built into the CPU board as standard. This RCC port supports up to 2048 digital points or a mixed configuration of up to 1024 digital and 1024 analog points. These I/O points can be located on up to 16 remote bases. The last RBC can be located up to 1000 m (3,300 ft.) from the CPU.

Remote base controller

The RBC is an intelligent interface between remote I/O bases and the 545/555/575 controllers. The RBC is installed in the remote I/O base. SIMATIC 505 RBCs are available with either coaxial or shielded twisted-pair cable. This allows the 545/555/575 controllers to be compatible with remote I/O bases. RBCs using coaxial cable, can be located up to 4000 m (13,200 ft.) from the PLC rack. RBCs using shielded twisted-pair, can be located up to 1000 m (3,300 ft.) from the PLC rack. Three models are available:

- Remote Base Controller RS485 (PPX:505-6851-A)
- Remote Base Controller COAX (PPX:505-6850-A)
- COAX to RS-485 converter (PPX:505-6860)

PROFIBUS-DP Remote I/O Connection

This technique is used by the 545/555/575 PLCs. Most 505 CPUs come with PROFIBUS-DP built-in. Others require an optional annex card.

- PROFIBUS-DP annex card (PPX:505-CP5434-DP)
- PROFIBUS-DP 505 RBC (PPX:505-6870)

The 505 PROFIBUS-DP I/O Channel supports up to 112 slaves (drops) of mixed analog and discrete modules. The 505 PROFIBUS-DP RBC can be installed in any 505 base to allow a 505 I/O base to perform as a PROFIBUS-DP I/O node on any PROFIBUS-DP system.

The 505 DP RBC has a serial port for remote programming when used on a 505 system only. However, SIMATIC 505 special function modules are not supported by the DP RBC.

Each PROFIBUS-DP node can have a maximum of 244 bytes of input and 244 bytes of output data. Each byte supports 8 digital inputs or outputs. Each analog point requires 2 bytes of data.

Depending on the baud rate selected, the PROFIBUS-DP cable length can extend up to 100 meters at 12 Mbaud and up to 1200 meters at 9.6 Kbaud. (up to 100km by using repeaters)

2

Technical Specifications

Mounting racks (bases) Type	PPX:	505-6504	505-6508	505-6511	505-6516
Slots					
Number of I/O slots		4	8	11	16
I/O points	max	128	256	352	512
Width	mm	203 (8.0”)	286 (11.25”)	448 (17.62”)	448 (17.62”)
Depth	mm	203 (8.0”)	203 (8.0”)	203 (8.0”)	203 (8.0”)
Height	mm	266 (10.47”)	266 (10.47”)	266 (10.47”)	266 (10.47”)
Dual media/power supply		no	no	yes	no

The internal power supply (5.1/±12/+24 V DC) is operated with an external feed voltage of 24 V DC/230 V AC.

Technical Specifications

Power supply units				
Type	**PPX:**	**505-6660**	**505-6660-A/B**	**505-6663/-A**
Input voltage				
Rated value		85 to 132 V AC 170 to 264 V AC	85 to 132 V AC 170 to 264 V AC	20 to 30 V DC
Output power				
Rated value		60 W	60 W	60 W
Galvanic isolation		yes	yes	yes
Short-circuit protection		yes	yes	yes
Redundant		yes	yes	no

Description and Ordering Information

Technical Specifications

Digital input modules PPX:	505-4008-A	505-4016-A	505-4032-A	505-4108	505-4116	505-4132	505-4208-A	505-4216-A
Inputs								
Number	8	16	32	8	16	32	8	16
Galvanic isolation	yes	yes	yes	yes	yes	yes	yes	yes
in groups of	2	4	8	2	4	8	2	4
Input voltage	20 to 56 V AC	20 to 56 V AC	20 to 56 V AC	6 to 12 V DC	6 to 12 V DC	6 to 12 V DC	79 to 132 V AC	79 to 132 V AC
Input current								
"1" signal type	28 mA	28 mA	28 mA	22 mA	22 mA	22 mA	15 mA	15 mA
Slots	1	1	1	1	1	1	1	1

Digital input modules PPX:	505-2580	505-4232-A	505-4308	505-4316-A	505-4332	505-4408-A	505-4416-A	505-4432-A
Inputs	Isolated							
Number	16	32	8	16	32	8	16	32
Galvanic isolation	yes	yes	yes	yes	yes	yes	yes	yes
in groups of	1	8	2	4	8	2	4	8
Input voltage	95 to 132 VAC	79 to 132 V AC	14 to 30 V DC	14 to 53 V DC	14 to 30 V DC	164 to 256 V AC	164 to 256 V AC	164 to 256 V AC
Input current								
"1" signal type	7 mA	15 mA	15 mA	15 mA	15 mA	20 mA	20 mA	20 mA
Slots	1	1	1	1	1	1	1	2

Digital output modules PPX:	505-2590 -A	505-3508	505-3516	505-3532	505-3708	505-3716	505-3732
Outputs	Isolated						
Number	16	8	16	32	8	16	32
Galvanic isolation	yes	yes	yes	yes	yes	yes	yes
in groups of	1	2	4	8	2	4	8
Supply voltage	20 to 132 VAC	4.5 to 34 V DC	4.5 to 34 V DC	4.5 to 34 V DC	4.5 to 34 V DC	4.5 to 34 V DC	4.5 to 34 V DC
Output current "1"	2.0 A	0.5 A	0.5 A	2.0 A	2.0 A	2.0 A	
Short-circuit protection	Fuse [1]	Fuse	Fuse	Fuse	Fuse	Fuse	Fuse
Slots	1	1	1	1	2	2	2

Digital output modules PPX:	505-4508	505-4516	505-4532	505-4608	505-4616	505-4632
Type	sourcing	sourcing	sourcing	TRIAC	TRIAC	TRIAC
Outputs						
Number	8	16	32	8	16	32
Galvanic isolation	yes	yes	yes	yes	yes	yes
in groups of	2	4	8	2	4	8
Supply voltage	4.5 to 34 V DC	4.5 to 34 V DC	4.5 to 34 V DC	20 to 132 V AC	20 to 132 V AC	20 to 132 V AC
Output current "1"	0.5 A	0.5 A	0.5 A	0.5 A	0.5 A	0.5 A
Short-circuit protection	Fuse	Fuse	Fuse	Fuse	Fuse	Fuse
Slots	1	1	1	1	1	1

Digital output modules PPX:	505-4708	505-4716	505-4732	505-4808	505-4816	505-4832
Type	sourcing	sourcing	sourcing	TRIAC	TRIAC	TRIAC
Outputs						
Number	8	16	32	8	16	32
Galvanic isolation	yes	yes	yes	yes	yes	yes
in groups of	2	4	8	2	4	8
Supply voltage	4.5 to 34 V DC	4.5 to 34 V DC	4.5 to 34 V DC	8.5 to 256 V AC	8.5 to 256 V AC	8.5 to 256 V AC
Output current "1"	2 A	2 A	2 A	2 A	2 A	2 A
Short-circuit protection	Fuse	Fuse	Fuse	Fuse	Fuse	Fuse
Slots	2	2	2	2	2	2

[1] With blown fuse detection and reporting to the PLC

Description and Ordering Information (Continued)

Technical Specifications

NEW!

Relay output modules	PPX:	505-4908	505-4916-A	505-4932-A	505-5417	505-5518
Voltage range		20 to 265 V AC 4.5 to 30V DC	20 to 265 V AC 4.5 to 30V DC	20 to 265 V AC 4.5 to 30V DC	10 to 125 V AC 0 to 120 V DC	20 to 265 V AC 10 to 54 V DC
Outputs						
Number		8	16	32	16	
Current		2 A per point	2 A per point	2 A per point	1 A per point	5 A per point/240 VAC[1]
3 A per point/24 V DC						
Total relay contact resistance		300 m ohm	250 m ohm	250 m ohm	50 m ohm	100 m ohm
Short-circuit protection		Fuse	Fuse	Fuse	Fuse	Fuse
Slots		1	1	2	1	1

Interrupt modules	PPX:	505-4317	505-4319
Rated Voltage		24 VDC	125 VDC
Input Voltage Range		10-30 VDC	112.5-137.5 VDC
Number of Inputs		**16**	**16**
Non-Interrupt		08	08
Interrupt		08	08
Slots		1	1
Galvanic Insulation In Groups Of		1	1

[1] The 505-5518 has a jumper selectable RC or “snubber” circut across each output contact that suppresses arcing, reduces noise and greatly extends contact life when switching heavy inductive loads.

Description and Ordering Information (Continued)

NEW!

NEW!

Technical Specifications

Analog input modules	PPX:	505-2555	505-6108-A
Inputs			
Number		16	8
Input ranges		0 to 5VDC, 0 to -10VDC, -5 to +5VDC, -10 to +10 VDC, 0 to +10VDC, -20 to +20 mA, 0 to 20mA	0 to 5V, -5 to +5V, 0 to 20 mA, -10 to +l0V
Update time		5.9 ms all; 8.2 ms w/filtering	250 ms all channels
Resolution		13 bits bipolar, 14 bits unipolar	12 bits
Galvanic isolation		yes, 140 Vrms CMRR	yes
Slots		1	1

Analog output modules	PPX:	505-6208-A
Outputs		
Number		8
Galvanic isolation		yes
Output ranges		0 to 10 V, 0 to 20 mA
Resolution		12 bit
Conversion time		Max. 56 ms
Supply voltage		
Rated value		24 V DC
Slots		1

Analog input/output modules	PPX:	505-7012	505-7016
Inputs			
Number		8, differential bipolar	8, differential bipolar
Range		0 to 10V, 0 to 50 mV, 0 to 20 mA	0 to 10V, 0 to 50 mV, 0 to 20 mA
Resolution		input: 15 bit, output: 12 bit	input: 13 bit, output: 12 bit
Outputs			
Number		4	4 unipolar isolated
Range		0 to 10 V, 0 to 20 mA	+/- 0 to 10 V, 0 to 20 mA
Isolation			
between inputs		100 V common-mode voltage	100 V common-mode voltage
between outputs		l500 V AC	l500 V AC
Update time		20 ms/input, 24 ms for all outputs	0.5 ms/channel input
Power supply		24 V DC, outputs only	24 V AC/DC, outputs only
Slots		1	1

Thermocouple/RTD modules	PPX:	505-2556	505-2557	505-7028	505-7038
Inputs					
Type		Thermocouple	RTD	Thermocouple	RTD
Number		16	16	8	8
Resolution		16 bit	16 bit	14 bit	0.003 ohm (l9 bit)
Update time		20 ms all channels	20 ms all channels	250 ms	120 ms per active input
Input range		-55 to +55 mV		-50 to +50 mV	
Probe types		J, K, T, E, R, S, L (Din J) (C and N by SPC)	100 ohm,platinum, 120 ohm nickel, 10 ohm copper	J, K, T, E, R, S, N	100 ohm, 200 ohm, 500 ohm platinum, 120 ohm nickel, 10 ohm copper
Advanced features		Averaging, scaling, filtering, peak and valley hold, alarming.	Averaging, scaling, filtering, peak and valley hold, alarming.		
Open sensor detect		yes	yes	no	no
Slots		1	1	1	1

Description and Ordering Information (Continued)

Technical Specifications

Word input/output modules	PPX:	505-6308	505-6408
Application		Interfacing the PLC to input devices such as thumb wheel switches, analog to digital converters and many other devices that use multi-parallel word codes, such as BCD, Gray code or other binary codes.	
Function		Input	Output
Inputs		TTL, CMOS, <28 V DC	TTL, CMOS DC
Update time	**max.**	8ms	16ms
Power supply		20 to 30 V DC	20 to 30 V DC
Slots		2	2

Technical Specifications

Simulator modules	PPX:	505-6010	505-6011
Application		Debugging ladder logic programs, monitoring output points, or directly controlling input points. They are also excellent for training purposes.	
Function		Input	Output
Simulation points		32	32
Indicators (LED)		32	32
Slots		1	1

Very High speed counter & encoding module	PPX:		505-7003
High speed counter module	**PPX:**	**505-7002**	
Application		To control process variables (position, velocity, flow) that the CPU cannot control due to timing constraints.	
Design			
Number of counters		2	2 quadrature counters @ 24 bits, 4 up/down counters @ 16 bit
Counting range		0 to 65,535 up/down or quadrature(software selectable)	0 to 65,535 up/down or 16,777,215 quadrature (software selectable)
Counting speed		50 kHz maximum (40% duty cycle)	100 kHz maximum (100% duty cycle)
Minimum pulse width on time		8 µs	11 µs
Minimum pulse width off time		3.9 µs	4.1 µs
Inputs		4 counting inputs, 4 to 28 V DC	6 counting inputs, 4 to 28 V DC
Outputs		4 control outputs	8 control outputs
Slots		2	1

Basic module	PPX:	505-7101
Application		Complex math, data handling, or external device interfaces.
Design		
Number of interfaces		2 (RS 232 C/423)
Transmission rate		110-19,200 baud (selectable)
Memory size		28 Kbytes (battery backed)
Memory buffers		
Input		28 ASCII characters
Output		128/1024 ASCII characters
Slots		1

Fieldbus interface module	PPX:	505-7202
Application		Provides connectivity to SIMOREG/SIMOVERT drives, PROFIBUS DP I/O and SAMMS Motor controllers from **545, 555 and 575 CPU's (except 545-1103).** Number of FIM's/CON: 15 Number of Drops/FIM: 15/16 Max Communication Speed: PROFIBUS DP 1.5MBaud All Others 38.4 K Baud Slots: 1

Description and Ordering Information (Continued)

Technical Specifications

386/ATM module	PPX:	505-ATM-4120
Application		High performance computing
Design		
CPU		80C386SX (socket for 80C387SX math processor)
RAM		4 Mbytes DRAM
Operating system		MS-DOS 5.0
HD drive		512 Mbytes
Floppy drive		3.5", 1.44 Mbytes
Drivers		Language independent, direct RLL programming & status interface between the 386/ATM and the PLC
Slots		3

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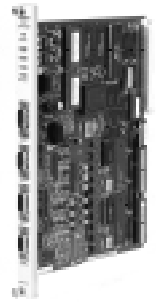
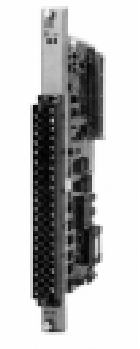


Technical Specifications

PPX:	505-2571 Program Port Expander
Application	Provides 4 additional communications ports which function like the program port on the CPU
Module Type	Special Function
Practical Support	NITP (TBP not supported)
Baud Rates	1200, 2400, 9600, 19200
Port 1 Description	RS-232C, male DB9
Port 2 Description	RS-232C, male DB9
Port 3 Description	RS-422, female DB9
Port 4 Description	RS-422, female DB9

2



Technical Specifications

Special modules PPX:	505-5100 (Turbo Plastic module)	505-5103 (Turbo Parison module)
Application	Provides a flexible, integrated control system for injection molding machines. Closed-loop profiles for clamping, pressure and velocity control are implemented.	Provides a flexible, integrated control system for blow molding machines. It can control up to 4 die heads and 2 accumulators or rams.
Update time	< 2 ms	1 to 32 ms (user configurable)
Inputs		
Digital	4 points, 0 to +28 V DC	
Analog	5 points, 0 to +5/ 0 to +10 V DC	5 points, 0 to +10 V DC
Outputs		
Digital	4 points, 15 to +24 V DC / 500 mA	4 points, 15 to +24 V DC / 500 mA
Analog	4 points, -10 to +10 V DC / 5 mA	4 points, -10 to +10 V DC / 5 mA
Slots	1	1

Adapter modules PPX:	6MT Adapter 505-5190	7MT Adapter 505-7190
Type I/O	6MT, 5MT Discrete	7MT Analog
Number of Points for Adapter	256 inputs & 256 outputs if located in local or remote base 208 inputs and 240 outputs if located in a 525 or 535 CPU distributed base	128 in local or remote base only 1 to 32 ms (user configurable) Does not operate in a distributed base
Update Time	10ms	Every scan if so configured
Power Requirements	+9.5VDC Class 2.4 amp Power Supply or from 5TI	±12/+5VDC Power Supply or PM550™ Power Supply
Type Module	Special Function	Special Function
Number slots	1	1

Application, Function

The perfect integration platform

The SIMATIC 575 Industrial Controller is the integration platform that maximizes the performance of your control application. Through a standard VMEbus, this powerful system lets you take advantage of intelligent off-the-shelf modules that specifically match your needs, while eliminating the integration bottlenecks found in many dedicated systems. The SIMATIC 575 industrial controller is the perfect integration platform for your application.

Start with a proven foundation

The SIMATIC 575 controller combines the proven advantages of the SIMATIC 545 PLC with the inherent flexibility of VMEbus. This industrial control system incorporates the user-friendly TISOFT programming language and higher level capabilities of SIMATIC APT (Application Productivity Tool) to help you solve the most demanding applications quickly and easily. Plus, it allows complete connectivity with the SIMATIC 505, S5 and S7 families of I/O and intelligent modules for a solution that meets your current requirements and will let you take advantage of future technology.

Multiple masters improve data exchange

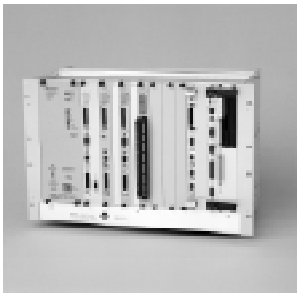
The multiple master strategy of the SIMATIC 575 industrial controller improves data exchange. Whether the modules you incorporate into the system are manufactured by Siemens or from other vendors, the SIMATIC 575 allows free exchange of control information, making it a true integration platform.

For added performance, you may choose specific task-oriented modules or a multi-processing approach. In either case, the control tasks are separated among the individual processors, significantly increasing system performance.

Through this open architecture approach, you have the capability to choose the modules that will best meet your application. It all fits together when using the SIMATIC 575 as your integration platform.

Fitting it all together

For industrial control applications that require state-of-the-art VMEbus solutions, the SIMATIC 575 is the integration platform that pulls it all together. Whether you need motion control, real-time data, an embedded PC, machine vision, inspection, or even a specialty I/O device, the SIMATIC 575 is the integrated control solution that fits your application.



Technical Specifications

NEW!

Central Processing Unit PPX:	575-2104	575-2105	575-2106
RLL scan time	0.9mS/K	0.45mS/K	0.45mS/K
User memory	832Kb	832Kb	1856Kb
Global memory	64Kb	64Kb	64Kb
Physical I/O (Any Mix)	8192/CPU	8192/CPU	8192/CPU
Regulatory control	64 PID loops	64 PID loops	64 PID loops
Analog alarms	128	128	128
Communication ports	2-RS232, 2-RS422	2-RS232, 2-RS422	2-RS232, 2-RS422
Number of Annex cards supported/CPU	1	1	1

Remote Bases: PPX:	505-6851-A
With optional PPX:575-2126 505 Remote I/O Channel Annex Card:	
Remote Bases	15/CPU
I/O channel update	1Mbaud

PPX:	505-6870
With optional PPX:505-CP5434-DP I/O Channel Annex Card:	
Max number of Slaves:	112
[1]Max slave distance:	
9600 Kbaud	1200 meters
12 Mbaud	100 meters
Max I/O Channel Update	12 Mbaud

[1] Greater distances can be obtained using Siemens fiber optic cabling.

NEW!

CPU Memory Size

575-2104/2105 Total Memory 832 KBytes

Memory Type	Block Allocation Size	Required per Block	Minimum Size	Maximum Size -2104 / 2105	Total Required for Maximum -2104 / 2105
Ladder (L)	1K byxtes	3K bytes	1K bytes	273K bytes	819K bytes
Variable (V)	1K bytes	1K bytes	1K bytes	187K bytes	817K bytes
Constant (K)	1K bytes	1K bytes	0K bytes	816K bytes	816K bytes
Special (S)	1K bytes	1K bytes	0K bytes	1840K bytes	1840K bytes
Compiled Special (CS)	1K bytes	1K bytes	0K bytes	816K bytes	816K bytes
User (U)	1K bytes	1K bytes	0K bytes	816K bytes	816K bytes
TMR/CTR	1024 per block	5K bytes	1024	20,480	100K bytes
DRUMs	64 per block	3K bytes	64	2304	108K bytes
Shift registers	1024 per block	1K bytes	1024	16,384	16K bytes
Table moves	1024 per block	2K bytes	1024	14,336	28K bytes
One shots	1024 per block	1K bytes	1024	32,768	32K bytes

575-2106 Total Memory 1856 KBytes

Memory Type	Block Allocation Size	Required per Block	Minimum Size	Maximum Size	Total Required for Maximum
Ladder (L)	1K byxtes	3K bytes	1K bytes	1856K bytes	–
Variable (V)	1K bytes	1K bytes	1K bytes	614K bytes	1842K bytes
Constant (K)	1K bytes	1K bytes	0K bytes	1841K bytes	1841K bytes
Special (S)	1K bytes	1K bytes	0K bytes	1840K bytes	1840K bytes
Compiled Special (SF)	1K bytes	1K bytes	0K bytes	1840K bytes	1840K bytes
User (U)	1K bytes	1K bytes	0K bytes	1840K bytes	1840K bytes
TMR/CTR	1024 per block	5K bytes	1024	20,480	100K bytes
DRUMs	64 per block	3K bytes	64	2304	108K bytes
Shift registers	1024 per block	1K bytes	1024	16,384	16K bytes
Table moves	1024 per block	2K bytes	1024	14,336	28K bytes
One shots	1024 per block	1K bytes	1024	32,768	32K bytes

NOTE: The CPU has 23,552 control relays (CRS).
The following are retentive:
769-1024
1793-2048
2817-3072
3841-4096
4865-5120
5889-6144
6913-7168
7937-10240

Description and Ordering Data

Overview

The PPX:575-6660 Power Supply provides up to 185 W to the VME base. It operates on either 110 or 220 VAC input voltage, depending on the position of the user-accessible jumper selector. The PPX:575-6663 Power Supply provides up to 300 W to the VME base. It operates on 110 VAC input voltage.

Power Supply Specifications

Input Specifications		PPX:575-6660 Power Supply	PPX:575-6663 Power Supply
AC input voltage		110 VAC (85—132 VAC)	110/220 VAC, jumper selectable (85—132, 170—264 VAC)
Input voltage frequency		47 to 63 Hz	47 to 63 Hz
Input current			
	maximum operating	5 A rms	8 A rms
	inrush	50 A peak for up to 100 ms	50 A peak for up to 100 ms
	overcurrent protection	fuse provided	fuse provided
	Input fusing	8 A, 250 VAC, slow-blow, 3 AG fuse	10 A, 250 VAC, slow-blow, 3 AG fuse
Output Specifications			
Voltage	**Range**	**Current Rating**	**Current Rating**
+5	4.875 to 5.250	25 A	35 A
+12	11.64 to 12.60	3 A	6 A[1]
-12	-11.64 to -12.60	2 A	4 A[1]
V_{stdby} (Run mode)	4.875 to 5.250	1 A[2]	1 A[2]
V_{stdby} (Battery backup mode)	3 to 5 volts	100 mA[3]	100 mA[3]
Dimensions		10.3" H x 6.3" D x 3.6" W	10.3" H x 6.3" D x 3.6" W

[1]The load power supplied by the +12 or -12 volt output must not exceed the power supplied by the +5 volt output (i.e., with a 5 A load on the +5 V, the load current supplied by the +12 or -12 must not exceed 2A.

[2]+5 V current draw must be reduced by the amount of the V_{stdby} current used.

[3]The battery will maintain memory for a time inversely proportional to the current consumed (e.g. 5Ah / 4 mA = 52 days, assuming a fully charged battery).

NOTE: The backplane termination consumes 1.0 A from the +5 V supply.

Description and Ordering Information

Technical Specifications

Discrete Input Modules PPX:	575-4232	575-4332
Inputs:		
Number	32	32
Galvanic Isolation	yes	yes
In groups of	8	8
Voltage Range	79 to 132 VAC	14 to 36 VDC
Input Current		
Type "1"	4.0 to 15 mA	2.0 to 15 mA
Module Width	1"	1"

Discrete Output/Relay Modules PPX:	575-4616	575-4532	575-4732	575-4916 (Relay)
Outputs:				
Number	16	32	32	16
Galvanic Isolation	yes	yes	yes	yes
In groups of	4	8	8	4
Voltage Range	79 to 132 VAC	4.5 to 36 VDC	4.5 to 36 VDC	4.5 to 36 VDC 20 to 265 VAC
Output Current				
Type "1"	1.0 amp	0.5 amp	2.0 amp	2.0 A Resistive 1.0 A Inductive AC 0.88 Inductive DC
Short Circuit Protection	Fuse	Fuse	Fuse	Fuse
Module Width	1"	1"	1"	1"

Discrete Input/Output Module PPX:	575-4366
Inputs:	
Number	16
Galvanic Isolation	yes
In groups of	8
Voltage Range	14 to 36 VDC
Input Current	
Type "1"	0.5 Amp
Outputs:	
Galvanic Isolation	16
In groups of	8
Short Circuit Protection	Fuse
Module Width	1"

SIMATIC NET Industrial Communications

3

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The following section provides an overview of Siemens' SIMATIC NET components and capabilities. Please refer to the SIMATIC NET Catalog IK10 for complete details and additional products available.

	Page
SIMATIC NET, Introduction	3/2
PROFIBUS bus components	3/5
Interface modules for PROFIBUS	3/12
Industrial Ethernet bus components	3/19
Interface modules for Industrial Ethernet	3/25
TIWAY Communications network	3/30

Introduction

Productivity in manufacturing greatly depends on the flexibility of the automation systems used. It is easier to keep large plants that extend over wide areas flexible if they are controlled by a number of distributed automation systems. And distributed control requires good data communications. Bus systems have proven to be the most economical solution in large industrial plants. They offer the following advantages:

- Reduced cabling costs
- Easy expandability
- Communications over a single data bus.

The field-proven SIMATIC NET bus-type networks are used to network SIMATIC 505 programmable controllers.

Features of the SIMATIC networks:

- Compliance with national and international standards
- Designed for industry
- Open systems: automation components from other vendors can be integrated into the communications network.

SIMATIC NET industrial communications offers its users the following networks providing increasing levels of performance:

- AS-Interface, an open technology for connection of actuators and sensors to an intelligent bus sytem.
- PROFIBUS EN 50170, for low-end and mid-range applications.
- Industrial Ethernet to ISO standards (Ethernet; IEEE 802.3), for the topend performance range.

For further information, see Catalog IK 10.

AS-interface (AS-i)

The AS-Interface is a networking system for binary sensors and actuators at the lowest field level. Process signals originating on site are usually transmitted to the controller using extensive parallel wiring and input/output modules. This means that each sensor or actuator is connected to the input/output modules with its own cable.

AS-Interface allows replacing of this wiring harness by a simple two-wire cable commonly used by all sensors or actuators.

A significant feature of the AS-Interface technology is the use of a common, unshielded two-wire cable for data transmission and distribution of auxiliary power to sensors/actuators.

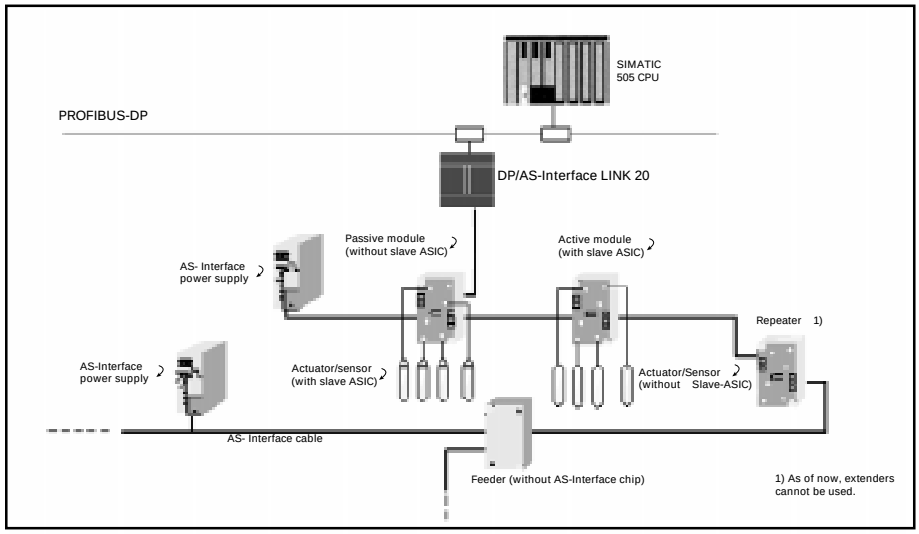


Fig. 3/1 The SIMATIC 505 can easily collect data of an AS-i bus using a DP/AS-i link.

PROFIBUS system

PROFIBUS (Process Field Bus) is the network provided by Siemens to address the needs of field level communications.

By meeting the requirements of the European standard EN 50170, Vol.2, PROFIBUS ensures open connectivity of components and conformance with products from other manufactures.

- PROFIBUS-DP for high-speed communications with distributed I/Os
- PROFIBUS-FMS for universal peer-to-peer communications.
- PROFIBUS-PA (Process automation) A powerful protocol profile based on PROFIBUS-DP with an intrinsically safe transmission system complying with international standard IEC 1158-2.

PROFIBUS uses several transmission methods:

- Electrical, via twisted-pair cables (RS-485 technology)
- Optical, with glass or plastic fiber conductors; immune to electromagnetic noise and suitable for use over large distances.

PROFIBUS electrical:

- Stations connected by bus terminals or bus connectors; individual segments are interconnected by repeaters.
- Maximum range: 1200 m / 3936 ft without repeaters, 9600 m/ 31,488 ft. with repeaters (depending on data transfer rate).

PROFIBUS optical:

- Star, ring or linear bus topologies via optical link modules (OLMs).

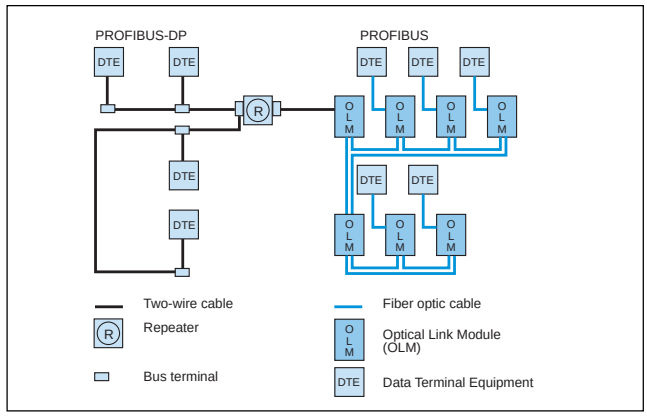


Fig. 3/2 Sample configuration for a PROFIBUS network

- Glass or plastic-fiber cables as optical waveguides.
- Maximum length of network roughly 100 km / 62.5 miles (max. distance between two OLMs: 15 km / 9.37 miles with the OLM/S-1300 using monomode fiber).

The main features of PROFIBUS are:

- Configuration per EN 50170
- 127 nodes; up to 32 of these nodes - programmable controllers, programming devices and PCs, for example - can be active
- Software-selectable data transfer rate (9.6 to12,000 Kbps).

The following equipment can be networked:

- SIMATIC 505 programmable controllers
- SIMATIC S7-300 and S7-400 programmable controllers
- SIMATIC S5 programmable controllers
- Field devices with PROFIBUS interfaces, e.g. ET 200
- SIMATIC HMI systems (COROS®)
- Drives, SIMOCODE motor protection devices
- SIMATIC PC industrial computers and SINUMERIK CNCs

In addition to the available standard, we offer additional communication functions on the same PROFIBUS network.

- The SIMATIC S7 functions for optimized communications with HMI applications and S7-300/400 PLCs.
- Communication function blocks (CFBs), for simple data block transfers to S5 and S7-300/400 PLCs (SEND/RECEIVE interface).

Industrial Ethernet bus system

The access method used by the Industrial Ethernet network is CSMA/CD (carrier sense multiple access with collision detection), as standardized in IEEE 802.3 (Ethernet).

To enable you to use a well-known Ethernet communication on the factory floor, we offer reliable and FM rated equipment as well as an extended shielding/grounding concept (i.e. Industrial Ethernet.)

Industrial Ethernet offers a number of transmission options:

■ Industrial Ethernet electrical:

The Industrial Ethernet electrical bus network uses triaxial cable (50 ohms) as its transmission medium.

Industrial Twisted Pair is a type of double-shielded twisted-pair cable which is especially well suited for industrial applications, and which is offered as an adjunct and alternative to conventional bus cabling for the connection of data terminal equipment.

■ Industrial Ethernet optical:

The optical variant of Industrial Ethernet cable uses fiber-optic cable as its transmission medium and is based on a star topology.

The Industrial Ethernet electrical network and optical network can be mixed.

The following equipment can be connected to the Industrial Ethernet network:

- SIMATIC 505 controllers
- SIMATIC S7-300 and S7-400 controllers
- SIMATIC S5 controllers
- PCs and PGs
- Certified systems of other manufacturers.

The SIMATIC network communicates with the SIMATIC 505 by the following methods:

■ Open communication by means of SIMATIC-TF (technological functions)[1].

■ Communication via TCP/IP protocol for easy interconnection of SIMATIC 505 devices and for hook-ups to PCs and HMI systems. The necessary functions are already present in the CP operating system.

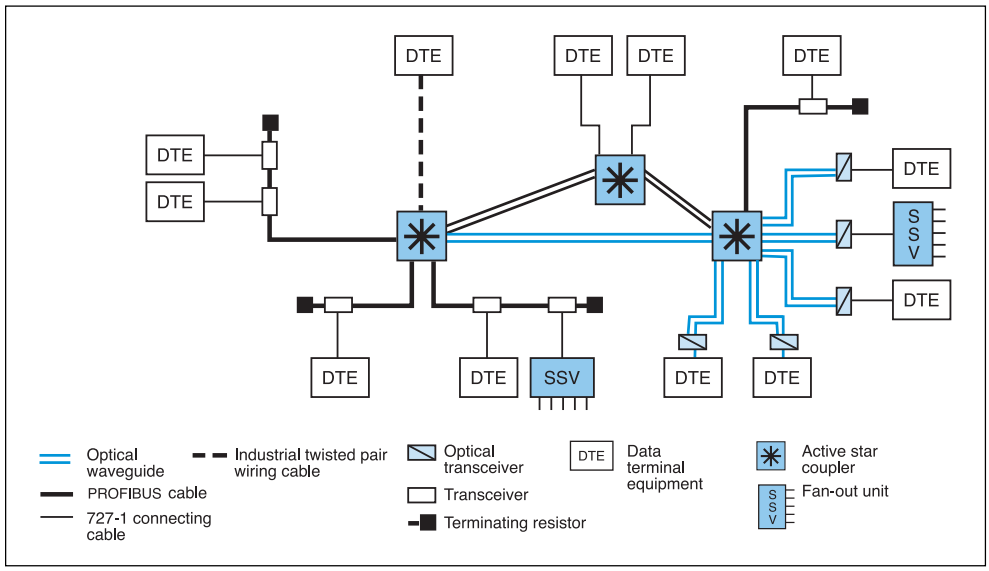


Fig. 3/3 Mixed Industrial Ethernet configuration

[1]Communications are configured on the Communications Processor (interface) and invoked from the user application program in the PLC.

PROFIBUS cables

Application

PROFIBUS cables are supplied for the connection of SIMATIC networks.

Double shielding makes them especially well suited for installation in industrial environments with high levels of electromagnetic interference.

Ordering data

	Order No.		Order No.
Electrical cable 2-wire, shielded; Sold by the meter: maximum unit size: 1000 m / 3280 ft. Minimum order: 20 m / 65.6 ft.		• **Bus cable with PE sheath** for the food industry	**6XV1 830-0BH10**
• **bus cable**	**6XV1 830-0AH10**	• **Bus cable for suspended cabling**	**6XV1 830-3CH10**
• **buried cable**	**6XV1 830-3AH10**	• **Bus cable halogen free** (flame retardant)	**6XV1 830-0CH10**
• **trailing cable**	**6XV1 830-3BH10**		

For further information see Catalog IK 10.

PROFIBUS fiber-optic cables

Application

PROFIBUS fiber-optic cables are supplied for the connection of optical networks.

These fiber-optic cables are available with glass or plastic optical fiber conductors:

- Standard glass fiber-optic cable for indoor and outdoor applications
- Trailing glass fiber-optic cable for indoor and outdoor applications
- Plastic fiber-optic cable for indoor applications, for PROFIBUS optical networks only.

For further information see Catalog IK 10.

Ordering data

	Order No.
SIMATIC NET glass fiber-optic cable standard format, splittable, pre-terminated with 4 BFOC socket connectors	**6XV1 820-5B** ■ ■ ■ *
SIMATIC NET flexible fiber-optic cable trailing format, splittable, pre-terminated with 4 BFOC socket connectors	**6XV1 820-6B** ■ ■ ■
BFOC socket connectors for fiber-optic cable Specify standard or trailing	**6GK1 901-0DA20-0AA0**
Indoor fiber optic cable Indoor fiber optic cable, splittable precut/preassembled with 4BF0C connectors	For order information see Catalog IK 10.
CUPOFLEX BFOC PVC simplex cable PVC, UL 3.6 mm/ 0.14 in for OLM/P single-fiber rings Max. length 65 m / 213.2 ft.	**5DX8 021-8AA** ■ ■
CUPOFLEX BFOC PVC twin cable, UL 3.6 mm/ 0.14 in for OLM/P networks in bus and star topologies Max. length 65 m/213.2 ft.	**5DX8 031-8AA** ■ ■

	Order No.
BF0C pigtail set 2 x 50 m set of 2 connectors, plastic FO cable with one BFOC connector fitted at one end for connecting OLM/P to OLP.	**6XV1 830-6BN50**
Non-precut/assembled cables CUPOFLEX simplex PVC UL 2.2 mm core for OLM 12M or OLP single-fiber ring	**5DX6 312-4AA01**
CUPOFLEX duplex PVC UL 2.2 mm core for OLM12M networks in in-line and star structure.	**5 DX6 322-4AA01**

*For length key, see following page

Length data on SIMATIC NET glass fiber-optic cable and SIMATIC NET PROFIBUS plastic connecting cable

Length key

Glass fiber-optic cable			**Plastic connecting cable**		
Length in m = Multiplication factor x length number		Order No. Extension	Length in m = Length number		Order No. Extension
		6XV1 . . .-. . ■ ■ ■			**5DX8 . . .-. . ■ ■**
Multiplication factor	0.1 m/.33 ft	**H**	Length number (m)	0.	**0**
	1 m/3.28 ft	**N**		1.	**1**
	10 m/32.8 ft	**T**		2.	**2**
	100 m/328 ft	**U**		3.	**3**
Length number	0.	**0**		4.	**4**
	1.	**1**		5.	**5**
	2.	**2**		6.	**6**
	3.	**3**		7.	**7**
	4.	**4**		8.	**8**
	5.	**5**		.0	**0**
	6.	**6**		.1	**1**
	7.	**7**		.2	**2**
	8.	**8**		.3	**3**
	.0	**0**		.4	**4**
	.1	**1**		.5	**5**
	.2	**2**		.6	**6**
	.3	**3**		.7	**7**
	.4	**4**		.8	**8**
	.5	**5**			
	.6	**6**			
	.7	**7**			
	.8	**8**			
Lengths containing the number 9 are not permitted. Maximum length: 650 m / 2132 ft.			Lengths containing the number 9 are not permitted.		
Example Length 160 m/ 525 ft.		**6XV1 . . .-. . T16**	**Example** Length 50 m/ 164 ft.		**5DX8 . . .-. . . 50**

SIMATIC NET glass fiber-optic cable

Terminated glass fiber-optic cable is available in the following increments, depending on the total length:

Total length	Increment
1 m to 20 m / 3.28 ft to 65.6 ft	1 m / 3.28 ft
>20 m to 50 m / 65.6 ft. to 164 ft	2 m / 6.56 ft
>50 m to 100 m / 164 ft. to 328 ft	5 m / 16.4 ft
>100 m to 500 m / 328 ft. to 1640 ft	10 m / 32.8 ft
>500 m to 1000 m / 1640 ft. to 3280 ft	50 m / 164 ft

RS 485 IP 20 repeater for data transfer rates of up to 12 Mbps

Application

The RS-485 IP 20 repeater connects two PROFIBUS bus segments to a maximum of 32 stations using RS-485 technology. It expands the data transfer rate capability of PROFIBUS to include speeds of 3, 6 and 12 Mbps.

The maximum permissible segment length for these additional data transfer rates is 100 m / 328 ft.

Design

- Repeater in IP 20 housing
- Two terminal blocks for segment connection
- Terminal block for power supply (24 V DC, external)
- Interface for PGs and PCs
- Rotary switch for data transfer rate adjustment

Ordering data	Order No.		Order No.
RS-485 IP 20 repeater 24 V DC, IP 20 housing; for data transfer rates of up to 500 Kbps	**6GK1 510-0AC00**	**RS-485 IP 20 repeater** 24 V DC; for data transfer rates of up to 12 Mbps	**6ES7972-0AA00-0XA0**
RS-485 IP 65 repeater 24 V DC, IP 65 housing; for data transfer rates of up to 500 Kbps	**6GK1 510-0AD00**		

For further information see Catalog IK 10.

3

PROFIBUS ILM (infrared link module)

- Wireless PROFIBUS link for all protocols
- Sturdy construction features IP 65 (NEMA 4)
- 15 m (49 ft.) range

Fig. 3/4 PROFIBUS ILM

Application

- Wirelss transmission of PROFIBUS data at close ranges (≤ 15 m) (49 ft)
- Links individual nodes within one segment or links two segments.
- Communicates with mobile nodes e.g. automated guided vehicle system (AGVS)
- Communicates with changing peers, e.g. stations located in conveyors or production lines.
- Lets you establish installations quickly. Convenient if installation is only temporary (e.g., for test installations.
- Replaces systems that are subject to wear, e.g. collector rings and brushes.

PROFIBUS ILM

Design

- Sturdy cast aluminum housing features IP 65 degree of protection
- 2x2-pole terminal block located in housing (cable led through heavy gauge conduit thread) provides connection for PROFIBUS segment.
- 4-pole terminal block located in housing (cable led through heavy duty conduit connectors) for supply voltage (DC 24 V), and signalling contact.
- Stationary wiring, which lets you replace electronic equipment fast if a fault occurs.
- Status display uses LED's to show operating status.
- Set transmission rate with interior switch.
- Protected against interfering ambient light by integrated natural light filter.
- Simple alignment procedure with flat cover (± 10° angles)

System configuration (monomaster operation)

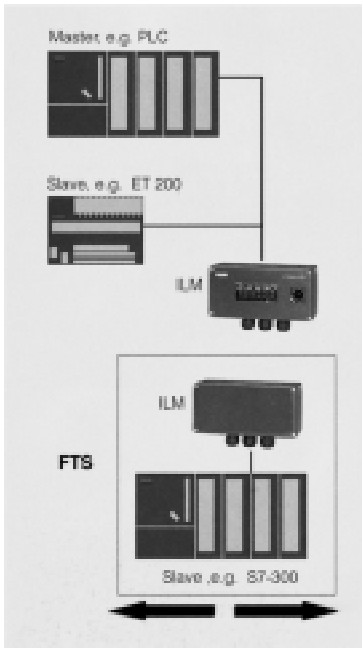


Fig. 3/5 Link to mobile nodes

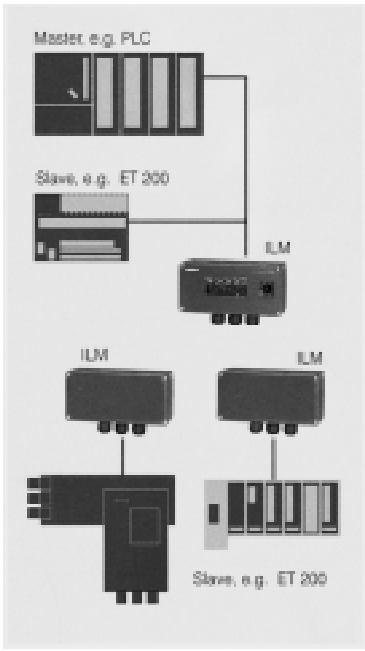


Fig. 3/6 Link to varying nodes

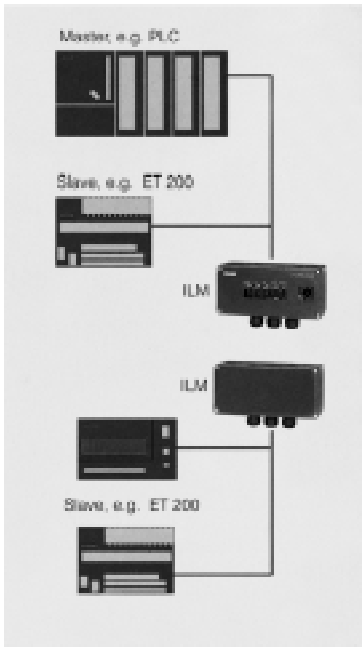


Fig. 3/7 Links two segments

Ordering data see attached order data only

Ordering data	Order No.
PROFIBUS ILM Infrared Link Module, lets you link PROFIBUS nodes and segments without cables	**6GK1 503-0AA00**

PROFIBUS Optical Link Modules (OLMs)

Application

The PROFIBUS optical link modules can be used to:

- Configure PROFIBUS optical networks of bus, simple ring and star topology
- Interconnect PROFIBUS electrical and optical networks
- Construct PROFIBUS redundant fiber optic rings

The OLMs are available for both glass-fiber and plastic-fiber conductors. They come in two versions:

- Three-channel module for linking two PROFIBUS segments via fiber-optic conductors using RS-485 transmission technology or for configuring simple ring topologies
- Four-channel module for configuring bus or star topologies or redundant optical rings.

Design

The PROFIBUS OLMs feature:

- A 9-pin subminiature D socket and 2-pin terminal block for connecting bus segments via an RS-485 interface
- An optical/electrical converter
- One (3-channel module) or two (4-channel module) fiber-optic conductor interface pairs with standards BFOC socket connectors (ST-compatible) for connecting fiber-optic conductors.

The OLMs snap onto a DIN rail, or flush mount using machine screws.

3

Ordering data	Order No.		Order No.
PROFIBUS L2 OLM/P3 Optical link module for plastic fiber-optic conductors 3-channel version	**6GK1 502-3AA10**	**PROFIBUS L2 OLM/S4** Optical link module for glass fiber-optic conductors 4-channel version	**6GK1 502-4AB10**
PROFIBUS L2 OLM/P4 Optical link module for plastic fiber-optic conductors 4-channel version	**6GK1 502-4AA10**	**PROFIBUS L2 OLM/S3-1300** Optical link module for glass fiber-optic conductors, for long distances, 3-channel version	**6GK1 502-3AC10**
PROFIBUS L2 OLM/S3 Optical link module for glass fiber-optic conductors 3-channel version	**6GK1 502-3AB10**	**PROFIBUS L2 OLM/S4-1300** Optical link module for glass fiber-optic conductors, for long distances, 4-channel version	**6GK1 502-4AC10**

For further information, see Catalog IK 10.

PROFIBUS optical link plug (OLP)

Application

Optical link plugs (OLP) are a simple means for configuring optical PROFIBUS networks with ring topologies (single-fiber ring with plastic FO cables).

The transmission integrity of PROFIBUS networks is greatly enhanced by using fiber optic instead of twisted-pair cables. This makes the network immune to interference by electromagnetic noise and over-voltage.

Substantial cost savings are achieved by using easy-to-install plastic fiber optic cables. Additional grounding measures are not required.

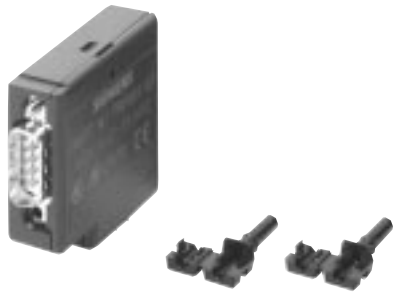


Fig. 3/8 PROFIBUS optical link plug (OLP)

Design

- The compact connector is plugged directly into the 9 pin sub D female connector on the PROFIBUS slave (power is supplied via DTE).
- The OLP is connected to the optical single-fiber ring via 2 simplex connectors.
- Simplex cores are used as plastic optical fiber. Simplex cores preassembled with a BFOC connector at one end (pigtails) are available for connecting the OLM/P to the single-fiber ring.
- Connection of up to 10 PROFIBUS slaves per single-fiber ring (1 OLP per slave).
- Connection of PROFIBUS masters and further PROFIBUS network segments via the electrical channels of an OLM/P3 or an OLM/P4[1)]
- The OLP may be plugged into the PG interface of the PROFIBUS RS-485 repeater, to the other segment of which several PROFIBUS slaves are connected via RS-485 (no masters).

1) Max. 1.5 Mbaud usage.

Ordering data	Order No.
PROFIBUS OLP Optical link plug for configuring optical single-fiber rings with plastic FO, including 2 simplex connectors and installation instructions.	**6GK1 502-1AA00**

For further information see Catalog IK 10.

SIMATIC 505-CP5434-FMS (Field Message Specification) PROFIBUS-FMS Communications Processor

- PROFIBUS-FMS master module for SIMATIC 505, exchange data with third-party devices – HMI, drives, other PLC's, etc.
- Supports protocols to interface with S5,S7 PLC's [1)]
- Peerlink service – high speed peer-to-peer communications between 505 PLCs of up to 100 V memory words every PLC scan.
- Supports up to 32 connections per module among any of 12 slaves on a single network.
- Supports up to 48 pre-programmed SEND/RECEIVE jobs triggered from PLC.
- High performance at a low price

[1)] (Send / Receive, S7-functions)

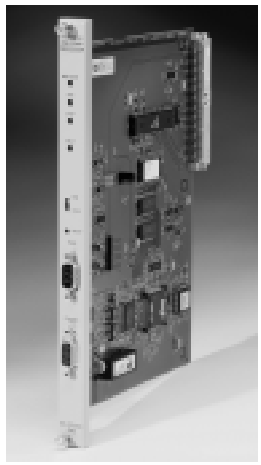


Fig. 3/9 505 PROFIBUS-FMS

NEW!

3

Connectable systems

- SIMATIC 505 (CPUs 545, 555, 565 and 575).

Design

- The FMS plugs directly into the SIMATIC 505 local or remote base that supports "Special Function" modules.
- 9-pin sub-D male connector (RS-232) to connect PC with configuration software (for network and data transfer configuration).
- 9-pin sub-D female connector (RS-485) f or connection to PROFIBUS-FMS network.
- The module can be connected to PROFIBUS via
  – an RS-485 bus terminal for PROFIBUS
  – or an RS-485 bus connector

Functions

- Communication via the following services:
  – FMS
  – S7 (read/write, server only)
  – Send/Receive

Configuring

- Win95 Configuration tool included.
- Configure over direct serial connection or over FMS network.

Technical specifications

Transmission rate • PROFIBUS	9.6K to 12 Mbits/s
Interfaces • connection to PROFIBUS-FMS • connection to PC/PG	9-pin sub-D female connector 9-pin sub-D male connector (RS232)
Supply Voltage	±5 V DC via backplane
Permissible ambient conditions • operating temperature • transportation/storage temp. • relative humidity	0 °C to 60 °C -40 °C to +70 °C 5 to 95%
Construction • module format • dimensions (WxHxD) in mm	Double Eurocard 20 x 266 x 170
Distances • Supports cable distances & communications rated from 100 meters at 12 Mbaud up to 1200 meters at 9.6 Kbaud. Even greater distances can be obtained with fiber-optic cables.	

Ordering data

SIMATIC 505-FMS Communications Processor for connecting the SIMATIC 505 to PROFIBUS-FMS including manual	**PPX:505-CP5434-FMS**
SIMATIC 505-FMS manual	**PPX:505-8129-1**

SIMATIC 505-FIM (field interface module)

- PROFIBUS-DP master module for SIMATIC 505
- Master module for data interchange with drives
- SAMMS
- SPI

Note: PROFIBUS-DP master port is also now available on most 505 CPU's. See Section 2.

Fig. 3/10 505-Field Interface Module (FIM)

Connectable systems

- SIMATIC 505 (CPU 545, 555 and 575 with 505 remote I/O channel support).

Design

- The FIM plugs directly into the SIMATIC 505 and requires a single-width slot.
- 9-pin sub-D male connector to connect a SIMATIC programmer or an AT-PC (for loading protocols)
- 9-pin sub-D female connector for connection to the CPU via the remote I/O cable. (The FIM appears logically to the PLC as a distributed I/O device; the backplane serves only for grounding and power).
- 9-pin sub-D female connector (RS-485) for connection to PROFIBUS for drive applications
- The module can be connected to the PROFIBUS LAN cable via
  - an RS-485 bus terminal for PROFIBUS
  - or an RS-485 bus connector
  - or an SF bus terminal for the optical PROFIBUS LAN (glass).
- The remote I/O base address and the protocol are set with mini rotary switches on the front plate.

Functions

- Communication via the following services:
- DP interface (distributed I/O).

  I/O communication between SIMATIC PLCs and PROFIBUS-DP field devices (slaves), using the PROFIBUS-DP protocol. Up to 16 slave stations can be connected and each can exchange up to 164 input/output bytes.
- USS Protocol.

Configuring

The communications protocol for the particular application is selected with a switch on the front of the module. No additional configuring software is required.

3

Technical specifications

Transmission rate	
• PROFIBUS-DP	9.6 to 1.5 Mbit/s
• Simple/USS protocol	4.8 to 38.4 Kbit/s
Interfaces	
• connection to PROFIBUS	9-pin sub-D female connector
• connection to 505 CPU (such as remote I/O)	9-pin sub-D female connector
• connection to PC/PG	9-pin sub-D female connector (RS232)
Supply voltage	+5 V DC via backplane
Current consumption	3.5 W at + 5 V DC
Permissible ambient conditions	
• operating temperature	0 °C to + 60 °C
• transportation/storage temp.	-40 °C to +70 °C
• relative humidity	5 to 95%
Construction	
• module format	Double Eurocard
• dimensions (W x H x D) in mm	20 x 266 x 170
• weight	300 g
• space requirements	1 slot
Max. number of static connections to be set up simultaneously	16

Ordering data

	Order No.
SIMATIC 505 FIM field interface module for connecting the SIMATIC 505 to PROFIBUS including manual	**PPX:505-7202**
SIMATIC 505-FIM manual	**PPX:505-8124-5**

DP/PA coupler and DP/PA link

- Bus coupling of PROFIBUS-DP (45.45 Kbit/s) and PROFIBUS-PA

NEW!

Fig. 3/11 DP/PA link coupler

Application

- Modular design (DP/PA coupler and DP/PAlink) in S7-300 design, with swivel-mounting onto a flat rail with screw fixing. The DP/PA coupler can be extended to become a DP/PA link.

DP/PA coupler:

- Housing in degree of protection IP 20
- 2 Versions of the DP/PA coupler:
  Non-hazardous area (non-Ex) version with up to 400 mA output current for the PA cable;
  Hazardous area (Ex) version with up to 90 to 120 mA output current. The PA cable of the Ex version can be used in the hazardous area. The DP/PA coupler itself must be installed outside the hazardous area.
- The maximum overall mounting depth is 130 mm, and height is 125 mm. The width of the DP/PA coupler is 80 mm.
- Four-pin screw terminals for connection of the 24 V DC
- 9-pin sub D female connector for PROFIBUS-DP
- Non-intrinsically safe version:
  4 screw terminals for connection to PROFIBUS-PA.
- Intrinsically safe version:
  two screw terminals for connection to PROFIBUS-PA
- The DP/PA coupler is always at the end of the PA cable. The terminating resistor integrated in the housing is always active. In both versions, the shield connection of the PA cable also serves as a strain relief.

DP/PA link:

- The DP/PA link is formed by the IM 157 interface module and one or more DP/PAcouplers (hazardous or non-hazardous area version). All components of the DP/PA link are interconnected via standard bus connectors.
  Ex and non-Ex versions of the DP/PA link are also possible by combining the IM 157 with Ex or non-0Ex versions of the DP/PA coupler.
  This modular system can be expanded to
  - up to 5 PA lines for the intrinsically safe version
  - up to 2 PA lines for the non-intrinsically safe version.
- The maximum overall mounting depth is 130 mm, and height 125 mm. The width of the Im 157 is 80 mm. The total width of the DP/PA link depends on the number of DP/PA couplers used.
- Connection to PROFIBUS-DP only at the IM 157 via a 9-pin sub D female connector. The PROFIBUS-DP interfaces of the DP/PA couplers used in the DP/PA link have no function.
- Non-intrinsically safe versions: 4 screw terminals of the DP/PA couplers in use for connection to PROFIBUS-PA.
- Intrinsically safe version:
  2 screw terminals of the DP/PA couplers in use for connection to PROFIBUS-PA
- The remaining design data are the same as for the DP/PA coupler.

DP/PA coupler and DP/PA link (continued)

Ordering data	Order No.
DP/PA coupler For transmission system transition from RS 485 to IEC 1158-2 • Intrinsically safe version (Ex) • Non-intrinsically safe version (Non-Ex)	**6ES7 157-2AD00-0XA0** Available soon
IM 157 Interface module for DP/PA link	Available soon

DP/AS-Interface Link 20

The benefits of the AS-Interface in a 505 environment can be easily used by a DP-AS-i Link.

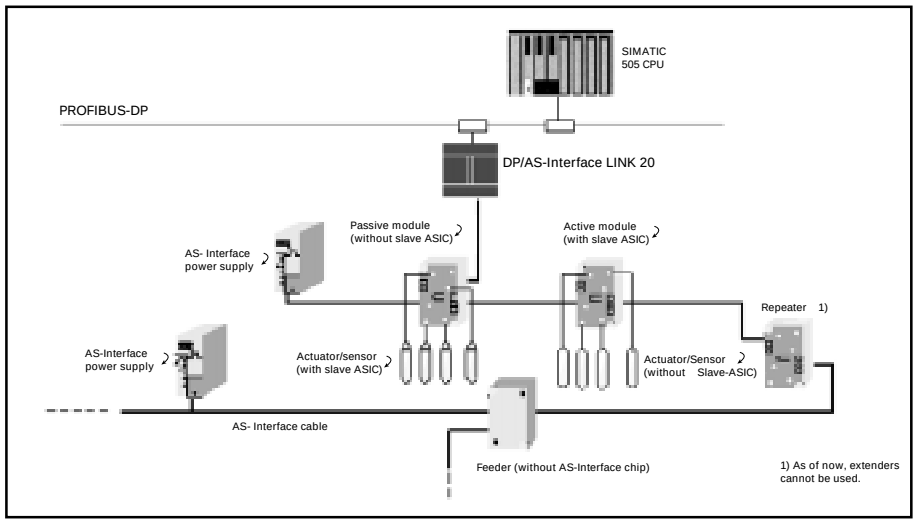


Fig. 3/12 Using DP/AS-interface Link 20 to interface PROFIBUS-DP with AS-Interface

For further information please see section 4

PROFIBUS System connection for PC/PG

PROFIBUS system connection for PC/PG

HARD NET

CP 5412 (A2) (ISA)

- CP with its own microprocessor
- Interface software runs on the CP
- PC/host is relieved of communications tasks
- Multi-protocol, up to two protocols can be operated simultaneously for
  - PROFIBUS-DP
  - PROFIBUS-FMS
  - S7 functions
  - SEND/RECEIVE
- PG functions

SOFT NET

CP 5411 (PCMCIA)

CP 5411 (PCI)

- CPs without microprocessors
- Entire protocol software runs on the PC/host (loading of the host)
- Single-protocol for
  - PROFIBUS-DP
  - S7 functions
  - SEND/RECEIVE
- PG functions (contained in STEP 7)

CP 5412 communications processor for programming devices and PCs

Introduction

Personal computers (with ISA slots) and the PG 740/760 programming devices can be connected via the CP 5412 (A2) communications processor to PROFIBUS in order to communicate with the SIMATIC programmable controllers.

Different protocols can be used to network via PROFIBUS.

- FMS for peer-to-peer services.
- DP for high speed, low overhead communications to distributed I/O.
- Send/Receive interface (FDL) for peer-to-peer communication (data blocks)
- S7 functions for optimized data exchange between S7 and PC applications.
- PG functions for SIMATIC S5/S7.

Retrofit kits are available to permit the use of communications processors using other operating systems.

For further information see Catalog IK 10.

Design

The CP 5412 has its own microprocessor and is equipped with:

- One 9-pin sub-D socket for connection to PROFIBUS via the RS-485 bus terminal.

The communications processors are plugged into a short slot on the programming device.

The CP 5412 is equipped with different software programs for different protocols.

3

Ordering data

	Order No.
CP 5412 Communications processor for conecting a PC/PG to profibus	**6GK1 541-2BA00**
CP 5412 and SOFTNET for PROFIBUS manual description of the FMS, DP, S7 functions Send/Receive (FDL) configuring tools	
• German	**6GK1 971-5CA00-0AA0**
• English	**6GK1 971-5CA00-0AA1**
FMS-Interface **FMS-5412/MS-DOS, windows** software for FMS protocol, including configuring software, running on CP5412 (A2), under MS-DOS from V6.2 and WfW from V3.11 on 3-1/2" floppy disk, production information in German/English	**6GK1 702-5FA41-0EA0**
FMS-5412/Windows 95 software for FMS protocol, including configuring software, running on CP 5412 (A2), on CD-ROM, product information in German/English	**6GK1 702-5FH41-3AA0**
FMS-5412/Windows NT software for FMS protocol, including configuring software, running on CP5412 (A2) under Windows NT 4.0 on CD-ROM, product information in German/English	**6GK1 702-5FB41-3AA0**
DP Interface **DP-5412/MS-DOS,Windows** software for DP protocol and software for FDL interface, including configuring software running on CP 5412 (A2) under MS-DOS from V6.2 and WfW from V3.11 On CD-ROM Production information in German/English	**5GK1 702-5DA41-0EA0**
DP-5412/Windows 95 software for DP protocol and FDL interface, including configuring software, running CP 5412 (A2), on CD-rom, product information in German/English	**6GK1 702-5DH41 3AA0**
DP-5412/Windows NT software for DP protocol and FDL interface, including configuring software, running on CP 5412 (A2) under Windows NT 4.0 on CD-ROM. Production information in German/English	**6GK1 702-5DB41-3AA0**
S7 functions **S7-5412/MS-DOS,Windows** software for S7 functions, including configuring software, running on CP 5412 (A2) under MOS-DOS from V6.2 and WfW from V3.11 on 3-1/2" floppy disk, product information in German/English	**6GK1 702-5CA41-0EA0**
S7-5412/Windows 95 software for S7 functions, including configuring software, running on CP 5412 (A2), on CD-ROM, product information in German/English	**6GK1 702-5CH41-3AA0**
S7-5412/Windows NT software for S7 functions, including configuring software, running on CP 5412 (A2) under Windows NT 4.0, on CD-ROM, product information in German/English.	**6GK1 702-5CB41-3AA0**
PG functions **PG-5412/MS-DOS,Windows** software for PG from STEP5 V6.5, running on CP 5412 (A2) under MOS-DOS from V6.2 and WfW from V3.11, on 3-1/2" floppy disk, product information in German/English	**6GK1 702-5PA41-0EA0**
PG5412/Windows 95 software for PG from STEP5 V6.5 and STEP7 V2.1, running on CP5412 (A2) on CD-ROM, product information in German/English.	**6GK1 702-5PH41-3AA0**
PG5412/Windows NT software for PG from STEP7 V3.2, running on CP 5412 (A2) under Windows NT 4.0, on CD-ROM, product information in German/English.	**6GK1 702-5PB41-3AA0**

Note: All 5412 software packages can only be operated with authorization.

CP 5511 and CP 5611 communications processors

Introduction

Fig. 3/13 CP 5511 and CP 5611

The CP 5x11 enable interfacing to PROFIBUS and MPI interface of the SIMATIC S7/M7.

The CP 5511 enables the connection of SIMATIC PG 720/740 and notebook PCs.

Programming devices/PCs equiped with PCI slots can be operated via CP 5611 on PROFIBUS.

Design

Connection with PROFIBUS is achieved with bus connectors/bus terminals.

CP 5511

- Type II PCMCIA card
- Adapter with 9-pin sub D female connector for connection to PROFIBUS.

CP 5611

- Short PCI card
- 9-pin sub D female connector for connection to PROFIBUS.

Functions

Both CPs run under various software packages. Owing to their similar architecture, users can run identical functions of programming devices and PCs via PROFIBUS-DP and the multipoint MPI interface.

Simple operation via plug & play is possible thanks to the PCI architecture of the CP 5611.

CP 5511 and CP 5611 are supported by the following packages:

- SOFTNET-DP/Windows 95, NT 4.0 for PROFIBUS: This package allows to make use of DP functions.
- SOFTNET-S7/Windows 95, NT 4.0 for PROFIBUS: This package allows to make use of S7 functions.

For order information, see Catalog IK 10.

OLE/DDE MANAGER

Application

With Windows 3.x, Windows 95 and Windows NT, the OLE (Object Linking and Embedding) communication interface allows the user software to combine software components (component ware) with other OLE 2.0 applications.

OLE 2.0 offers the means to develop small, re-usable software components, which can be marketed separately and may be combined with other OLE 2.0 appllications, the OLE/DDE manager enables PG/PC using standard applications such as:

- HMI systems
- Excel 5.0, 7.0
- Visual Basic 4.0,

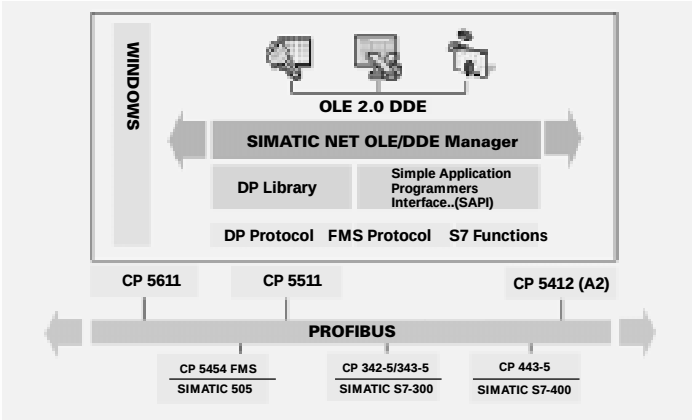


Fig. 3/14 OLE/DDE

equipped with the OLE 2.0 or DDE communication feature to communicate with other programmable controllers, e.g. with a SIMATIC.

PROFIBUS uses the FMS, DP or S7 protocols.

The main task of the OLE/DDE manager is to integrate Windows applications offered on the market into the automation environment.

For order information, see Catalog IK 10.

OPC Server

Introduction

OPC (OLE) for process control) is an operation with Windows NT as an extension of the COM (component object model) communication interface and DCOM (distributed component object model) for the user software.

The basic principle of OPC is that OPC client applications communicate on a standardized/open and, therefore, vendor-independent interface with the OPC server.

Facility for linking to existing OPC-capable Windows applications (Office 97 or HMI systems) are on the market.

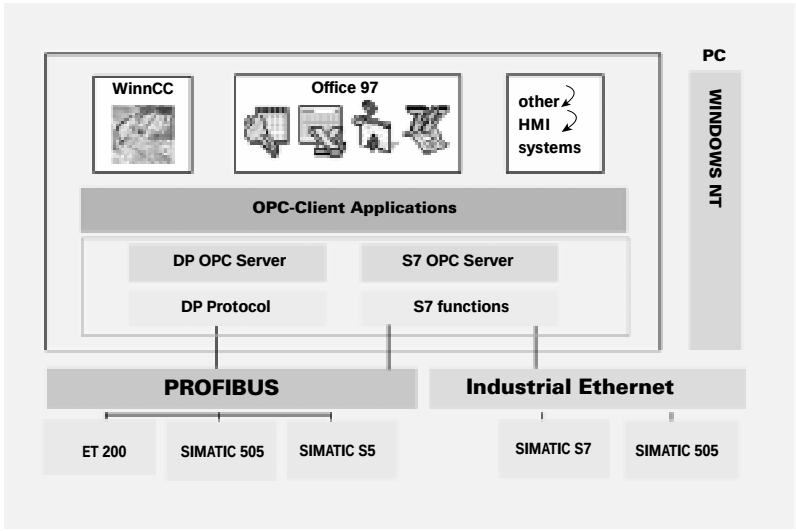


Fig. 3/15 System configuration OPC Servicer

Ordering data	Order no.
DP-OPC server/Windows NT 4.0 for PROFIBUS-DP protocol; under Windows NT 4.0 German/English	**6GK1 706-5DW12-3AA0**
S7-OPC server/Windows NT 4.0 for PROFIBUS-DP and Industrial Ethernet; under Windows NT 4.0 German/English	**6GK1 706-0CW12-3AA0**

SIMATIC NET ETHERNET 727-0 bus cable

Application

SIMATIC NET 727-0 bus cable provides the option of configuring Ethernet networks with triaxial technology.

The construction of its outer conductor and its grounded shield render the SIMATIC NET 727-0 impervious to high frequencies and immune to outside interference.

As a result, it is ideally suited for use in industrial environments subject to high electromagnetic interference. The aluminum shielding and the outer jacket of the SIMATIC NET 727-0 bus cable also make it suitable for buried installation.

Design

- Housing with degree of protection IP 20
- Shielded coaxial cable conforming to IEEE 802.3
- Three-wire conductor superior to Ethernet bus cable for office and laboratory applications
- Solid copper inner conductor and multilayer outer signaling cable
- Solid aluminum shielding
- Outer jacket.

Ordering data	Order No.
727-0 bus cable Sold by the meter	**6ES5 727-0AA11** Length in m

For further information see Catalog IK 10.

SIMATIC NET ETHERNET 727-1 dropcable

Application

SIMATIC NET 727-1 dropcable is used to connect terminals equipped with AUI interfaces to Ethernet network components that have AUI interfaces (transceivers, fan-out units, star couplers with AUI interface cards).

It is also used to connect switches, repeaters and fan-out units to Ethernet transceivers.

Design

- Consists of 4 separately shielded twisted pairs covered with an additional overall shield.
- Has a 15-pin sub-D plug and a 15-pin sub-D socket at each end.

Ordering data	Order No.
727-1 dropcable Length	
3.2 m / 10.5 ft	**6ES5 727-1BD20**
10 m / 32.8 ft	**6ES5 727-1CB00**
15 m / 49.2 ft	**6ES5 727-1CB50**
20 m / 65.6 ft	**6ES5 727-1CC00**
32 m / 105 ft	**6ES5 727-1CD20**
50 m / 164 ft	**6ES5 727-1CF00**

For further information see Catalog IK 10.

SIMATIC NET Industrial Ethernet industrial twisted-pair wiring cable

Application

SIMATIC NET industrial twisted-pair wiring cable is used to connect a terminal via its built-in twisted-pair transceiver or via the TPTR plug-in transceiver to a twisted-pair plug-in unit in the SIMATIC NET OLM/ELM or star coupler ASGE.

Application

- 2 x 2 or 4 x 2 wires
- Each wire pair stranded together with two dummy elements
- Each pair wrapped in plastic sheet and shielded with two thicknesses of plastic-lined aluminum foil
- Outer shield of tin-plated copper wire braid on all pairs
- Plastic jacket (PVC).

Ordering data	Order No.		Order No.
SIMATIC NET industrial twisted-pair wiring cable Terminated • **2 x 2 wire, incl one 9-pin and one 15-pin mounted connector** for direct connection (without patching) of a terminal with a built-in twisted-pair transceiver or via a TPTR plug-in transceiver		**Length** 2 m / 6.56 ft 5 m / 16.4 ft 8 m / 26.2 ft 12 m / 39.3 ft 15 m / 49.2 ft 20 m / 65.6 ft 30 m / 98.4 ft 40 m / 131.24 ft 50 m / 164 ft 60 m / 196.86 ft 70 m / 229.67 ft 80 m / 262.48 ft 90 m / 295.29 ft 100 m / 328 ft	 **6XV1 850-0BH20** **6XV1 850-0BH50** **6XV1 850-0BH80** **6XV1 850-0BN12** **6XV1 850-0BN15** **6XV1 850-0BN20** **6XV1 850-0BN30** **6XV1 850-0BN40** **6XV1 850-0BN50** **6XV1 850-0BN60** **6XV1 850-0BN70** **6XV1 850-0BN80** **6XV1 850-0BN88** **6XV1 850-0BT10**

For further information see Catalog IK 10.

SIMATIC NET ETHERNET fiber-optic cable

Application

SIMATIC NET fiber-optic cable is used to configure Industrial Ethernet optical networks.

Fiber-optic conductors for Industrial Ethernet networks are available in glass fiber only. The fiber-optic conductor is the same as used for PROFIBUS networks.

For SIMATIC NET FIBER-OPTIC CABLE, standard format, and SIMATIC NET FLEXIBLE FIBER-OPTIC CABLE, trailing format see PROFIBUS section.

SIMATIC NET INDUSTRIAL ETHERNET transceiver

Application

The SIMATIC Industrial Ethernet transceiver is available with either one or two interfaces, as necessary for connecting subscribers to the network via 727-0 bus cable.

The metal die-cast housing and special cable grounding provides exceptional immunity to EMI and RFI interference.

Design

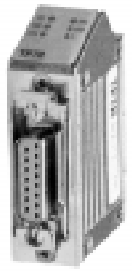
- Die-cast aluminum housing
- One or two 15-pin sub-D plug connectors for connecting terminals
- SIMATIC clamp with N coaxial socket connector for connection to the SIMATIC network
- The SIMATIC NET transceiver can be mounted on the clamp after the system is already installed.

Ordering data	Order No.		Order No.
SIBUKO Package 2 with transceiver (one interface), mounting equipment and mounting guide German, English, French	**6GK1 100-0AB00**	**SIBUKO Package 6** with transceiver (two interfaces), mounting equipment and mounting guide German, English, French	**6GK1 100-0AJ00**

For further information see Catalog IK 10.

SIMATIC NET industrial twisted-pair plug-in transceiver

Application



Devices that do not have a built-in industrial twisted-pair transceiver but do have an AUI interface can be connected to the twisted-pair network by means of TPTR.

The CP 1434 can be directly connected to an industrial twisted-pair network using the TPTR.

The TPTR is plugged into the device's AUI interface. The 15-pin sub-D plug connector of the industrial twisted-pair cable can then be connected to the sub-D socket connector of the TPTR.

Design

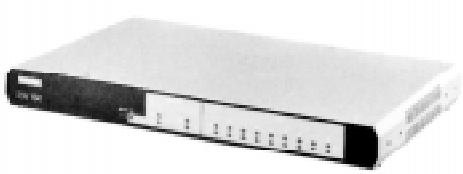
- AUI interface for connection to the terminal: 15-pin sub-D plug connector.
- MDI (medium dependent interface) for connecting the twisted-pair cable: 15-pin sub-D socket connector with slide lock.
- 6 Diagnostic LEDs.

Ordering data	Order No.
Industrial twisted-pair plug in transceiver (TPTR) for connecting an industrial twisted pair cable to the AUI interface of a terminal	**6GK1 100-0BA00**

For further information see Catalog IK 10.

SIMATIC NET SSV 104 fan-out unit

Application



SIMATIC NET SSV 104 fan-out unit serves to connect up to 8 terminals or communication processors to an Ethernet network via a SIMATIC transceiver or to the SIMATIC fiber optic network via an optical transceiver.

Design

- Built to the specifications of IEEE 802.3
- 8 AUI interfaces
- Can be used as
  - desktop unit or
  - 19" rack mount.

Ordering data	Order No.
SIMATIC SSV 104 fan-out unit with 8 interfaces	**6GK1 104-0AA00**

For further information see Catalog IK 10.

SIMATIC NET OTDE (BFOC) optical transceiver

Application

The SIMATIC NET MINI OTDE optical transceiver is used to connect a terminal to an optical network and to configure a fiber-optic link between two terminals.

The CP 1434 can be directly connected to an optical network using the MINI OTDE.

The MINI OTDE can be plugged directly into the terminal's AUI interface. It can be permanently installed by means of the wall mounting and connected with 727-1 dropcable.

Design

- Optical interface: two BFOCs/2.5 socket connectors (ST-compatible)
- Connection: Fiber-optic cable containing graded-index fiber (type 62.5/125 mm; compatible with IEEE 802.3 FOIRL) directly connectable to the ECFL2 fiber-optic interface card of an ASGE star coupler.

Ordering data	Order No.		Order No.
MINI OTDE (BFOC) optical transceiver for connecting a terminal (CP), fan-out unit or repeater to a fiber-optic cable	**HIR:943 303-021**	**Wall mounting** For the MINI OTDE	**HIR:943 426-001**

For further information see Catalog IK 10.

3

OLM and ELM for Industrial Ethernet

- Optimum configuration of the topology (linear, ring, star)
- High availability can be achieved with redundant power supply and redundant ring structure.
- Rapid and simple installation (standard DIN rail) and easy startup.
- Function monitoring via signalling contact.
- Repeater functional features.

Fig. 3/16 OLM and ELM

Application

SIMATIC NET link modules for industrial Ethernet enable the flexible, low-cost assembly of Ethernet LANs in compliance with IEEE 802.3, with fiber-optic cables and coppers conductors.

The link modules are suitable for operation in a system with distributed connection density.

The link modules offer multiple connection options in one unit.

The OLMs (optical link modules) have both electrical and optical interfaces; the ELMs (electrical link modules are a version with only electrical interfaces.

Used in Ethernet LANs, the link modules support both linear structures (with OLMs or ELMs via fiber optic or industrial twisted-pair (ITP) cables and reduncant optical ring structures (with OLMs only, via fiber optic ports).

OLM and ELM for Industrial Ethernet (continued)

Design

Electrical interface of the OLM and ELM:

- 3 x 9 -pin sub D female connectors for ITP cables.

OLM optical interface:

- 2 x BFOC female connectors for glass fiber

ELM electrical AUI interface:

Connection

- via 727-1 connecting cable and fan-out unit
- via TPTR to ITP
- via MINI-OTDE to the optical network

The signaling contact can be used to relay a digital signal to controllers or human-machine interface systems for evaluation.

The 24 V supply is provided via a terminal block. Redundant power supply configurations are supported.

Network Topologies

Various network structures can be implemented with the OLMs/ELMs:

- Linear structures with OLMs or ELMs via fiber optic or ITP cables (LAN expansion depends on cascading depth [1])
- Redundant ring structure with OLMs or ASGE star coupler via fiber-optic ports (LAN expansion depends on cascading depth).
- Combination of OLMs/ELMs with star couplers (max. cascading depth and residual cable length depend on configuration).
- Purly electrical structures with ELMs (LAN design according to configuration rules).
- Combination of OLMs/ELMs in fiber optic and coaxial segments (LAN design according to configuration rules).

* OLM's and ELM's can be directly interconnected with the ITP cascading cable (1m long) via an industrial twisted-pair.

	Electrical		Optical
	ITP	AUI signaling contact	BFOC connectors
OLM	3 1	—	2 x 2
ELM	3 1	1	—

1) max. 11 OLM in line or ring configuration, extension of the topologies with Multi LAN switch MR 8-03 for line and star structures. LAN planning must always take into account the rules in the manual of "ITP Networks for Industrial Ethernet" and the "Ethernet" Manual.

Diagnostics

LEDs are provided for diagnostics and indicate the following events:

- Collisions in the Ethernet LAN
- Receipt of data packets
- Link status (no error, error, standby in redundant systems)

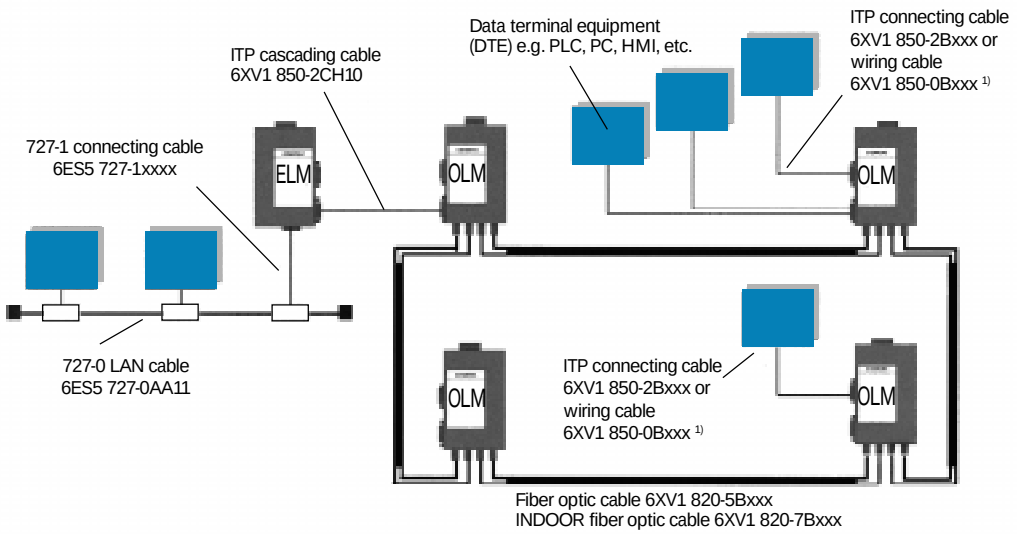
The signal contact is activated as soon as at least one of the following errors occurs:

- Long-term faults in the module
- Failure of at least one of the two power supplies
- Link status of at least one fiber optic or ITP port faulty.

Signaling of the statuses can be masked port-wise via a switch.

A fiber-optic port can also be switched to the redundant mode.

OLM and ELM for Industrial Ethernet (continued)



1) Depending on length

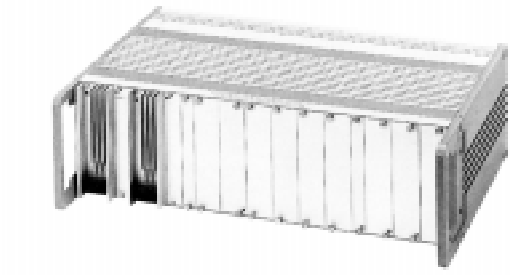
Fig. 3/17 Example of system configuration with OLMs and ELM for Industrial Ethernet

Ordering data	Order No.	Ordering data	Order No.
OLM for Industrial Ethernet Optical link module with 3 ITP ports and 2 FO ports; redundant power s upply and signaling contact	**6GK1 102-4A00**	**ELM for Industrial Ethernet** Electrical link module with 3 ITP ports and 1 AUI port; redundant power supply and signaling contact.	**6GK1 102-5AA00**
ITP cascading cable for Industrial Ethernet for cascading of link modules	**6XV1 850-2CH10**		

For further information see Catalog IK 10

SIMATIC NET ASGE active star coupler

Application



The active star couplers constitute the star branch points of SIMATIC ETHERNET in conformity with IEEE 802.3. Their modular design permits flexible network configuration using different transmission media such as

SIMATIC 727-0 bus cable (triaxial), Industrial twisted-pair cable and Fiber-optic cable or 727-1 connecting cables.

The optical signals are regenerated completely in the star coupler.

For further information see Catalog IK 10 1998, page 5/24.

SIMATIC 505-CP2572 Ethernet TCP/IP communications processor

The SIMATIC 505-CP2572 Ethernet TCP/IP Adapter is a single wide I/O module serving as a LAN (Local Area Network) interface module for SIMATIC 505 PLC's (Programmable Logic Controllers). The 505-CP2572 provides connectivity to Ethernet local area networks and allows the PLC to communicate with other network nodes using the transmission ControlProtocol/Internet Protocol (TCP/IP). Using the 505-CP2572, other devices on the network can acquire data from the PLC, send data and programs to the PLC, and exercise supervisory control over the PLC operation. In addition, the PLC can use the facilities of the 505-CP2572 to send messages to another node on the network.

The 505-CP2572 attaches to all Ethernet media specified by IEEE 802.3 including 10Base5 ("thick" coaxial cable), 10Base2 ("thin" coaxial cable), 10BaseT (unshielded twisted-pair cabling), and FOIRL (fiber optic cable). 10baseT cabling can be attached directly to the 505-CP2572 via an 8-pin (RJ-45) modular jack. Other IEEE 802.3 media may be connected to the AUI (Attachment Unit Interface) port, a user supplied transceiver. The transceiver can be powered externally to conserve PLC backplane power.

Fig. 3/18 SIMATIC 505 - CP2572

Connectable systems

- SIMATIC 505 (CPUs 525, 535, 545, 555, 565 and 575)

Design

- The SIMATIC 505 CP2572 plugs directly into the basic unit or an expansion unit and requires one slot.
- Date interchange via TCP/IP (Ethernet Transmission Control Protocol/Internet Protocol)
- Use as server and client
- Diagnostic utilities provided
- RFC-1006 Protocol for communications with S7 PLC's (Available soon)
- Provides two serial ports which function as additional PLC program ports (NITP protocol) for the local PLC or another PLC on the network. The ports may be used to configure the module.
- Full set of front panel diagnostic LEDs
- 2 front terminals for external power supply for AUI interface

Functions

The SIMATIC 505 CP2572 communications processor independently handles data traffic via Industrial Ethernet. The CAMP and NITP protocols are supported. Seen from the PLC, the SIMATIC 505 CP2572 is considered as a special module occupying 2 input words and 6 output words in the CPU address area.

Data blocks (V memory) can be transferred via the Ethernet LAN to other stations.

Remote programming over the LAN is possible

- In Server Mode, the module responds to PLC commands embedded in the TCP/IP packet.
- In Client Mode, the module can initiate a TCP/IP message with another node on the network. Client activity is the basis of peer-to-peer communications.
- In Serial Redirect Mode, the module routes data received at a serial port on the module to another node on the network. For example, a PC running TISOFT could download programs to other PLC's on the network.

Configuring

The 505-CP2572 module itself requires no customer programming. All configuration options can be set by module switches and a serially attached personal computer. Optionally, PLC logic can control the operation of the module, if desired. In order for a PC to communicate with the 505-CP2572 module, install an application software package on the PC. Contact your distributor for details.

Technical specifications

Transmission rate	10 Mbit/s
Interfaces Ethernet Ports	1-EEE 802.3 10BaseT, 8 pin Modular Jack (RJ-45) 1-EEE 802.3 AUI, female DB-15 connector 10BaseT port auto-selected if link Beat is present. AUI power derived from PLC backplane or external power supply
Serial Ports	1-RS 232C (subset), male BD9 connector, DTE 1-RS-422, female DB9 connector
Supply voltage	+5 DC (via backplane bus) +12 V DC (via front terminals for AUI)
Power consumption (via backplane bus) • +5 V DC • 12 V DC	 6 W (without AUI) 0.5 W (standard AUI)
Construction • Module format • Dimensions (W x H x D) in mm • Weight • Space requirement	 double Eurocard 20 x 266 x 170 0.3 kg 1 slot

Ordering data

SIMATIC 505-CP505-CP2572 including configuring software and manual	**PPX:505-CP2572**
SIMATIC 505-CP2572 manual	**505-8132-1**
Connecting Cable for direct connection of a programming device/PC to the CP (needed to configure the module	**PPX:2601094-8001**

See Catalog IK10 for further information

SIMATIC 505-CP1434 TF Ethernet communications processor

Designed for Industry

- Handling of message communication up to and including Layer 7 of the ISO 7-layer model
- The CP1434-TF fully relieves the PLC of communications tasks.
- Interfaces:
  - — TF/MMS interface (Layer 7)
  - — Transport interface (Layer 4)
  - — PC/PG interface
- Remote configuring over the LAN

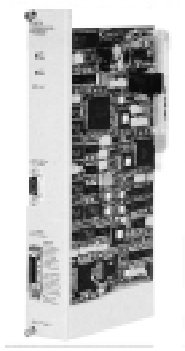


Fig. 3/19 SIMATIC 505 - CP1434-TF Ethernet communications processor

Connectable systems

- SIMATIC 505 (CPUs 525, 535, 545, 555, 565 and 575)

Design

- The CP1434-TF Ethernet communications processor plugs directly into a basic unit or expansion unit; it requires two slots.
- 15-pin sub-D female connector for connection to Industrial Ethernet via transceiver with the 727-1 connecting cable
- 9-pin RS-232/423 male connector for connection to PCs and programming devices

Functions

The SIMATIC 505 CP1434-TF Ethernet communications processor independently handles data traffic over the Industrial Ethernet.

Seen from the PLC, the SIMATIC 505 CP1434-TF is considered as a special module occupying eight input and eight output bytes in the CPU address area.

All types of variables as well as data blocks can be transferred via Ethernet to other stations.

All 7 layers of the ISO reference model are implemented on the module. Layers 1 to 4 comply with international standards.

SIMATIC NET AP is used for Layers 5 to 7a; the technological functions are available for Layer 7b.

- Communication using the TF protocol
- Simple data interchange between SIMATIC PLCs
- Remote programming over the LAN is possible.

Configuring

Transport links, application links and the parameters required for handling the technological functions are configured on a PC/PG, using configuring software based on MS-DOS WIndows.

The configuration data is stored in the RAM of the CP or in the EEPROM.

Technical specifications

Transmission rate	10 Mbit/s
Interfaces	
• for Industrial Ethernet	15-pin sub-D female
• for PG/PC	9-pin RS 232/423 male
Supply voltage	+/-5V; (via backplane bus)
Power consumption (via backplane bus)	
• +5 V DC	22 W (jumper E1 fitted) 10 W (jumper not fitted)
• -5 V DC	0.1 W
Permissible ambient conditions	
• Operating temperature	0 to 60 ˚C
• Transportation and storage temperature	-40 to +70 ˚C
• Relative humidity	5% to 95%
Construction	
• Module format	double Eurocard
• Dimensions (W x H x D) in mm	40 x 266 x 184
• Weight	0.4 kg
• Space requirement	2 slots
Configuration software	SIMATIC 505-CP1434-TF configuring software

Ordering data

SIMATIC 505-CP1434-TF including configuring software and manual	**PPX:505-CP1434-TF**
SIMATIC 505-CP1434-TF on a 3 1/2" floppy disk configuring software for MS-DOS/Windows	**PPX:505-CONF1434-2**
SIMATIC 505-CP1434-TF manual English	**PPX:505-8126-2**
Connecting cable for direct connection of programming device/PC to the CP	**PPX:201094-8001**

Industrial Ethernet System connection for PC/PG

HARD NET

CP 1413 (ISA)

- CP with its own microprocessors
- Protocol software runs on the CP
- PC/host is relieved of communications tasks
- Multiprotocol; up to 2 protocols can be operated simultaneously for
  - TF
  - MAP
  - S7 functions
  - SEND/RECEIVE
  - PG functions
- Additional PC networks can be operated
- Real-time synchronization

SOFT NET

CP 1411 (ISA)

CP 1511 (PCMCIA)

- CPs without microprocessors
- Entire protocol software runs on the PC/host (Loading of the host)
- Single protocol
  - S7 functions
  - SEND/RECEIVE
  - PG functions
- Additional PC networks can be operated

CP1413 communications processor

- Loadable firmware
- Multi-protocol capability
- Interfaces for
  - TF
  - MAP
  - S7 functions
  - SEND/RECEIVE
- Communications software for MS-DOS, Windows 3.11, Windows 95, Windows NT and UNIX

System interfacing to:

- AT-compatible PCs
- SIMATIC programming devices

Various packages with different software are available. A changeover to another operating system, for example, is possible with the same hardware using conversion packages.

Two protocols can be operated simultaneously.

Design

The CP 1413 plugs directly into the SIMATIC programming device or an AT-compatible PC, and requires a short slot.

- ISA Card
- 15-pin sub D female for connection to Industrial Ethernet.

The module is connected to the 727-0 LAN cable

- via a transceiver for the electrical LAN
- via a plug-in transceiver (TPTR) for ITP or
- via the optical transceiver MINI OTDE for an optical LAN.

Functions

The hardware and firmware on the module independently handle Layers 1 to 7a of the SIMATIC NET protocol. Additionally contained in the module are configuring, test and LAN management functions. Data interchange between module and host memory takes place via a dual-port RAM. The data transfer between host system and CP 1413 is handled by operating system-related interface drivers.

Communications in the SIMATIC NET system are carried out using the technological functions or S7 functions.

Figure 3/20 CP1413

Ordering data	Order No.
TF interface	
TF-NET1413/MS-DOS, Windows consisting of CP 1413 and TF-1413/MS-DOS, Windows German/English	**6GK1 141-3AE00**
TF-1413/MS-DOS, Windows Software for TF protocol and PG functions including configuring software, runs on CP 1413 under MS-DOS from V5.0 and Windows from V3.0 on 3 1/2" floppy disk German/English	**6GK1 701-1AA00-0EA0**
TF-NET1413/Windows 95 consisting of CP 1413 and TF-1413/MS-DOS, Windows German/English	**6GK1 141-3TH11**
TF-1413/Windows 95 Software for TF protocol and PG functions including configuring software, runs on CP 1413, under Windows 95 on CD-ROM German/English	**6GK1 701-1TH41-3AA0**
TF-NET1413/Windows NT consisting of CP 1413 and TF-1413 Windows NT 4.0 and PG functions including configuring software German/English	**6GK1 141-3TB11**
TF-1413/Windows NT Software for TF protocol including configuring software, runs on CP 1413, under under Windows NT 4.0 on CD-ROM German/English	**6GK1 701-1TB41-3AA0**

For further software options, see Catalog IK 10.

Interface modules for Industrial Ethernet

CP 1511 communications processor

- PCMCIA card for industrial Ethernet
- Allows connection of PG 720 to Industrial Ethernet
- Interfaces for
  - AUI
  - industrial twisted pair
  - RJ 45 (for office applications)
- Executable with SOFTNET packages and PC networks
- PG functionality

System interfacing to:

- SIMATIC PGs with PCMCIA port
- Notebooks with PCMCIA slot

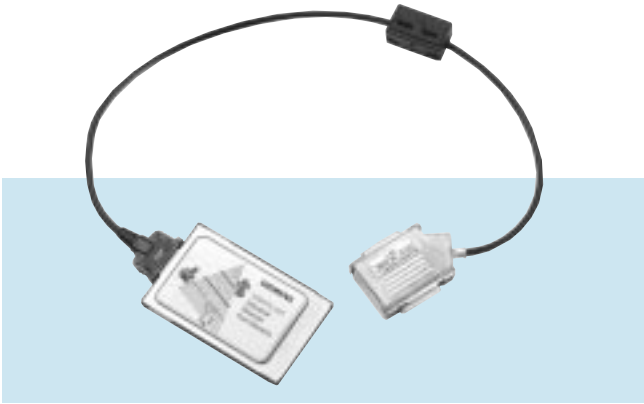


Fig. 3/21 CP 1511 with adaptor

Design

The CP 1511 can be operated in any computer with a slot complying with the PCMCIA 2.0 standard. Two adapters are supplied. One adapter is designed for connection to RJ 45, and the other one provides a connection to triaxial cable (AUI) and an industrial twisted pair.

It has the following interfaces:

- 15-pin sub D female for AUI connection.
- 15-pin sub D female for industrial twisted pair.

There are no jumpers on the module; it can be configured entirely by software.

Functions

The CP 1511 is an Ethernet card which can be operated in any programming device/PC with a free PCMCIA Type II slot.

The CP 1511 offers the following accesses:

- Layer 2:

  Interfacing for PC networks in an industrial enviroment.
- Ebene 4 und Ebene 7: In conjunction with the SOFTNET packages for Industrial Ethernet, the CP 1511 offers a low-cost access to Industrial Ethernet, such as SIMATIC S5/S7.

SOFTNET S5 and SOFTNET PG for Industrial Ethernet contain ODI drivers for the CP 1511.

In conjunction with all SOFTNET packages for Industrial Ethernet (except UNIX) the CP 1511 can be used in a PG 720 for remote programming (PG functions).

Ordering data	Order No.
CP 1511 PCMCIA card for connecting programming devices/PCs to Industrial Ethernet, including 2 adapters for AUI/industrial twisted pair and RJ45	**6GK1 151-1AA00**

For SOFTNET Packages see Catalog IK 10.

OLE/DDE manager

- OLE 2.0 and DDE-capable Windows applications for
  - TF protocol,
  - S7 functions
- Available for all Windows derivatives
- Uses an existing, installed protocol, such as TF or S7 functions.

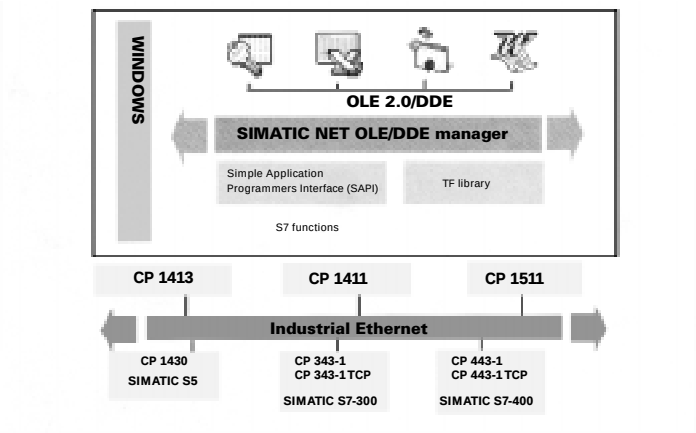


Fig. 3/22 OLE / DDE Manager

Application

With Windows 3.x, Windows 95 and Windows NT, the OLE (object linking and embedding) communications interface for user software makes it possible to combine software components (component ware) with other OLE 2.0 applications.

OLE 2.0 offers the facility for developing small, repeatedly used software components which can be marketed separately and combined with other OLE 2.0 applications. The OLE/DDE manager can be used to enable programming devices and PCs with standard applications such as

- HMI systems
- EXCEL 5.0
- Word for Windows 6.0 or
- Visual Basic 4.0

which have the OLE 2.0 or DDE communications mechanism to communicate with other programmable controllers such as SIMATIC. Protocols TF or S7 are used for Industrial Ethernet. The main task of the OLE/DDE manager is to link Windows applications available on the market to the field of automation.

Ordering data	Order No.
Overall packages: **OLE/DDE-Manager** Software for FMS/DP/TF protocol and S7 functions for linking Windows applications to SIMATIC NET automation systems: with product information and installation instructions, under Windows NT 4.0 or Windows 95 on CD ROM German/English	**6GK1 705-0AW13-3AA0**

For further information see Catalog IK 10.

OPC server

Applications

- Standardized, open vendor- independent interface
- OPC-capable Windows applications, (S7 functions)
- For Windows NT 4.0
- Efficient data interchange
- Simultaneous utilization of two or more servers by one client application
- Simultaneous utilization of two or more clients on one server application.
- OPC (OLE for process control) is in operation with Windows NT as an extension of the COM (component object model) communication interface and DCOM (distributed component object model) for the user software.
- The basic principle of OPC is that OPC client applications communicate on a standardized/ open and, therefore, vendor-independent interface with the OPC server.
- Facility for linking to existing OPC-capable Windows applications (Office 97 or HMI systems) on the market.

For ordering information see OPC/PROFIBUS

115 Kbaud HDLC

Ordering data	Order No.
UNILINK host adapter	
115 V AC, local line/local line TIWAY ports and RS-232C/423 host ports	**PPX:505-7111**
115 V AC, RS-232C/RS-232C TIWAY ports and RS-232C/423 host ports	**PPX:505-7112**
220 V AC, local line/local line TIWAY ports and RS-232C/423 host ports	**PPX:505-7113**
220 V AC, RS-232C/RS-232C TIWAY ports and RS-232C/423 host ports	**PPX:505-7114**
Personality Interface module	**PPX:500-6224**
Manuals	
Installation	**PPX:TIWAY-8106**
TIWAY system	**PPX:TIWAY-8101**
User's	**PPX:TIWAY-8121**
UNILINK secondary adapter	
115 V AC, local line/local line TIWAY ports and RS-232C/423 host ports	**PPX:500-7111**
115 V AC, with twice RS-232C/432 host ports	**PPX:500-7112**
220 V AC, local line/local line TIWAY ports and RS-232/432 host ports	**PPX:500-7113**
220 V AC, with twice RS-232/RS-232C host ports	**PPX:505-7114**
Manual	
English	**PPX:TIWAY-8102**
SIMATIC S5 PIM	**PPX:500-6262**
Manual	**PPX:TIWAY-8126-1**
UNILINK gateway for Honeywell & Foxboro Manual	**PPX:TIWAY-8104-2**
TIWAY network interface module (NIM) for 505 PLC	
5 V DC, 2 local line ports	**PPX:505-7339**
5 V DC, 2RS-232C ports	**PPX:505-7340**
Manual	**PPX:TIWAY-8124**
Modbus network interface module	
5 V DC, local line/local line TIWAY ports and RS-232C/423 host ports	**PPX:505-5184**
Manual	**PPX:505-8122-1**
Upgrade Firmware Release 3.2	**PPX:2601438-8009**
Peerlink module for 505 PLC	
110 VAC, local line/local line TIWAY ports and RS-232C/423 host ports	**PPX:505-7354**
Manual	
for Peerlink module	**PPX:TIWAY-8127-2**

PROFIBUS-DP
Distributed I/O

4

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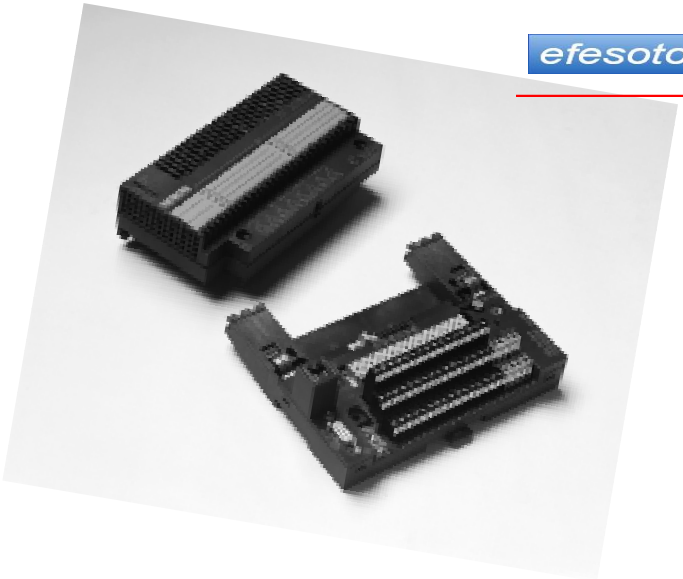

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SIMATIC ET 200B	4/10
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SIMATIC ET 200X	4/30
PROFIBUS DP/AS-i link	4/41

Introduction

Application

In conventionally automated plants, I/Os are plugged directly into the programmable controller. Frequently, this leads to extensive wiring with

- High cabling costs and
- Reduced flexibility in the case of modifications and expansions.

Linking the components via an open standardized fieldbus system provides a solution to these problems in plants automated with SIMATIC programmable controllers.

A distributed configuration means:

- The programmable controllers, I/O modules and field devices are connected over a single cable known as a fieldbus
- The I/O modules can be installed in the immediate vicinity of the sensors and actuators
- The process signals can be converted and processed locally.

Programming can be carried out in the same manner as with conventional configurations.

The following can be connected to the PROFIBUS-DP fieldbus:

Active stations

- The SIMATIC S7-300/400, SIMATIC M7-300/400 automation systems, SIMATIC S5-115U/H, S5-135U, S5-155U/H and SIMATIC 505 programmable controllers as well as from other manufacturers
- Programming devices and AT-compatible PCs
- SIMATIC Human-Machine interface (HMI) operator panel.

Passive stations

- ET200M/L/B/C/U and 505 RBC distributed I/O, S5-95U/DP slave, S5-115U, S5-135U, S5-155U and DP/AS-I link transceiver

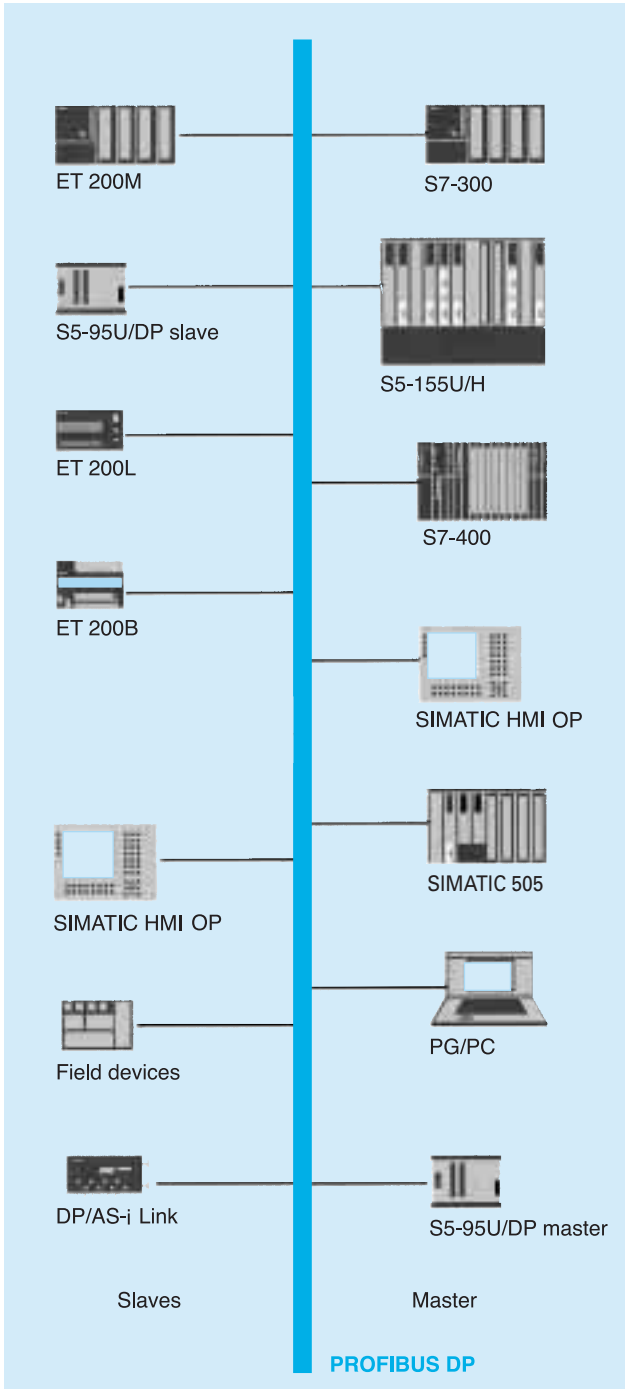


Fig.4/1 Example of a distributed I/O configuration

- Human-machine interface
- Additional field devices, as well as third-party devices with slave interface module

The following pages describe the distributed I/O stations, the interface modules for PROFIBUS-DP and the fieldbus itself.

ET 200M

Application

Fig. 4/2 ET 200M modular I/O station

The ET 200M is a modular I/O station for high-density configuration with a degree of protection IP 20.

It can be expanded with the signal, function and communication modules of the S7-300 programmable controller.

Thanks to the wide range of modules, the ET 200M is especially suitable for individual and complex automation tasks.

The ET 200M is a passive station (slave) on PROFIBUS-DP with a maximum data transfer rate of 12 Mbit/s.

The ET 200M can also be configured with active bus modules. This allows changing of S7-300 I/O modules during operation under power. Operation of the remaining module continues.

Design

The modular ET 200M I/O station consists of:

- IM 153 interface module
- Up to 8 I/O modules of the S7-300 programmable controller
- Power supply if required.

No definite slots are assigned to the I/O modules. The modules can be combined freely.

The ET 200M is connected to the PROFIBUS-DP via the IM 153 interface. Fiber-optic connection to PROFIBUS-DP is possible via an OLM (optical link module) or an OLP (optical link plug).

Various types of I/O modules can be plugged in depending on the quantity of framework of the master modules (see table below).

	IM 153-1 in ET 200M	IM 153-2 in ET 200M
S7 master module		
Function	PROFIBUS-DP standard slave with expanded S7 functionality	PROFIBUS-DP standard slave with expanded S7 functionality
Usable modules	All S7-300 signal modules, functions modules FM 350, FM 351 Fm 352	All S7-300 signal modules and all function modules
Other master modules		
Function	PROFIBUS-DP standard slave	PROFIBUS-DP standard slave
Usable Modules	All digital and analog S7-300 signal modules	All digital and analog S7-300 signal modules

ET 200M (continued)

Design (continued)

Configuration with bus connector

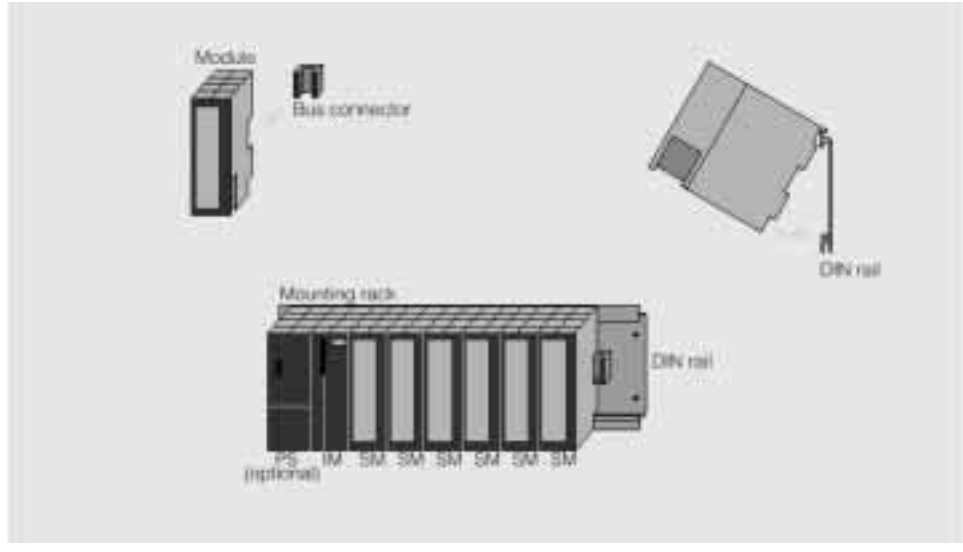


Fig.4/3 Configuration with bus connector

The ET 200M expands up to 8 modules by a U-shaped bus connector. This allows variable mounting lengths for easier integration into your process.

- Module assembly: Simply hang the modules onto the DIN rail, swing them down and tighten the screws.
- Integrated backplane bus: The backplane bus is integrated into the modules. The modules are connected via bus connectors plugged into the rear of the housing.

4

Configuration with active bus modules

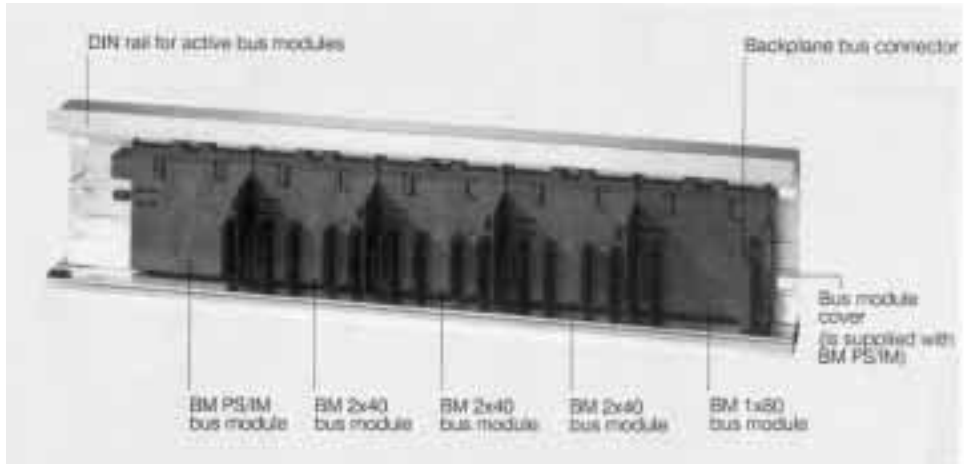

DIN rail for active bus modules
Backplane bus connector
Bus module cover (is supplied with BM PS/IM)
BM PS/IM bus module
BM 2x40 bus module
BM 2x40 bus module
BM 2x40 bus module
BM 1x80 bus module

Fig.4/4 Active bus modules

The active bus modules enable hot swapping of modules during operation:

- Time saving module replacement; it is not necessary to interrupt operation for changing modules. Operation simply continues with the remaining modules.

When the new module is plugged in, it is automatically started up.

With an S7-400 as master, removing/plugging in of a distributed module is treated like removing/plugging in of a centrally configured module. An interrupt is generated in the CPU.

With all other DP standard masters, a signal is transmitted to the master via DP diagnostics.

ET 200M (continued)

Design

Configuration with active bus modules

There are various bus modules available for configuring the ET 200M. These are mounted on special rails:

- BM PS/IM bus modules for power supply and IM 153
- BM 2x40 bus modules for 2 I/O modules with 40mm width.
- BM 1x80 bus modules for 1 I/O modules with 80mm width

An EX dividing panel is available as an accessory that can be inserted between each bus module.

- Simple assembly:
  The bus modules are swung onto the DIN rail, butted side to side and secured with lateral plug-in connectors.
  The modules can then be swung onto the bus modules and screwed into position establishing contact with the bus modules connector.

Connectors of unused slots must be protected with backplane bus covers and a bus module cover is inserted in the side of the last bus module.

Principle of operation

The input/outputs of the modular ET 200M station can be accessed from the user program in the automation system in the programmable controller in the same manner as the inputs and outputs of the central controller.

The communication across PROFIBUS is handled completely by the master interface module in the central controller and the IM 153 interface modules.

Correct ET 200M operation is verified by way of diagnostic functions.

The ET 200M diagnoses:

- Module faults,
- Short circuits (outputs),
- Bus errors, i.e. errored data transfer,
- 24 V DC load voltage supply,
- Plugging and removing I/O modules

The diagnostic data are analyzed as follows:

- At the source through diagnostic LED's on the ET 200M
- Centrally via the CPU in the programmable controller.

Configuring and parameterizing

Calculation of the required frame length for configuring and parameterization frame

	Configuration frame	Parameterization frame
Length	15 bytes + 5 bytes per S7-300 I/O module	10 bytes + 20 bytes per parameterizable S7-300 I/O module

The PROFIBUS-DP master must provide the required quantity of configuration and parameterization data. A few masters have a restricted configuration and parameterization frame length. On the S5-95U/DP, for example, the maximum length of the configuration and parameterization frames is 32 bytes each. This means in this example that up to 3 modules, one of which may be parameterizable, can be plugged into the ET 200M.

When the device is connected to master modules not parameterized with COM PROFIBUS or STEP 7 (operation on non-Siemens master modules), a fixed pre-assigned GSD file can be created with COM PROFIBUS from Version 3.1 (available soon, see Catalog ST50). This file is then loaded into the configuring tool of the non-Siemens manufacturer and can be used for simple parameterization of the station.

This allows use of COM PROFIBUS's user-friendly plaintext parameterization. There is no need of hexadecimal code inputs in the manufacturer's configuring tool.

ET 200M (continued)

Technical specifications

Connection method	Screw-type and spring-loaded method, hard wired	Atmospheric pressure	795 to 1080 hPa
		Mechanical stress	
Degree of protection	IP 20	• Vibrations	IEC 68, Part 2-6 10-57 Hz (Const.amplitude 0.075mm) 57-150Hz (constant acceleration 1g)
Ambient temperature on vertical wall (preferred mounting position)			
• With horizontal installation	0 to +60°C		
• With other installation	0 to +40°C	• Shock	IEC 68, Part 2-27 Half-sine, 15g. 11 ms
Relative humidity	15 to 95% (RH severity level 2 in accordance with IEC 1131-2)		

Technical specifications

Transmission protocol		PROFIBUS-DP per EN 50 170	Supply voltage • Rated Value • Permissable range (including ripple)		24 V DC 20 to 30 V
Data transfer rate	max.	12 Mbit/s automatically recognizes the bus system transfer rate	Power failure buffer		5 ms
Address space	max.	128 bytes for inputs	Current consumption at 24 V DC		625 mA
	max.	128 bytes for outputs	Output Voltage		5 V DC
Number of modules	max.	8	Output current (at 5 V DC)	max.	1 A (for backplane bus)
Interfaces • Isolation voltage • Connection to PROFIBUS		500 V 9-pin sub-D female connector	Degree of protection		IP 20
			Ambient temperature		0 to 60°C
Output current	max.	90 m A (for PROFIBUS-DP interface)	Dimensions (WxHxD) in mm/in		40x125x120/1.56x4.8x4.68
			Weight		0.35 kg

4

Ordering data

I/O modules, DIN rail, accessories	See Catalog ST 70, Section 3	**Active bus modules**	
RS-485 bus connector for PROFIBUS	See IK10	• BM PS/IM for power supply and IM 153, incl. 1 bus module cover	**6ES7 195-7HA00-0XA0**
Manual		• BM 2x40 bus module for 2 I/O modules with 40-mm width	**6ES7 195-7HB00-0XA0**
ET 200M distributed I/O station with description of the S7-300 signal modules		• BM 1x80 for 1 I/O module with 80-mm width	**6ES7 195-7HC00-0XA0**
German	**6ES7 153-1AA00-8AA0**	**Covers** Pack of 4 backplane bus covers and 1 bus module cover	**6ES7 195-1JA00-0XA0**
English	**6ES7 153-1AA00-8BA0**		
French	**6ES7 153-1AA00-8CA0**	**Ex dividing panel**	**6ES7 195-1KA00-0XA0**
Spanish	**6ES7 153-1AA00-8DA0**		
Italian	**6ES7 153-1AA00-8EA0**		
DIN rail for active bus modules for up to 5 active bus modules			
Length 19"	**6ES7 195-1GA00-0XA0**		
530mm	**6ES7 195-1GF30-0XA0**		

IM 153 Interface module for ET 200M

Ordering data

IM 153-1 Interface module [1] Slave interface module for connection of an ET 200M to the PROFIBUS-DP	**6ES7 153-1AA02-0XB0**	**Manual for the ET 200M distributed I/O station** with description of S7-300 signal modules	
IM 153-2 Interface module [1] Slave interface module for connection of an ET 200M to the PROFIBUS-DP	**6ES7 153-2AA00-0XB0**	German English French Spanish Italian	**6ES7 153-1AA00-8AA0** **6ES7 153-1AA00-8BA0** **6ES7 153-1AA00-8CA0** **6ES7 153-1AA00-8DA0** **6ES7 153-1AA00-8EA0**
RS-485 bus connector for PROFIBUS	See IK10		

1) For suitable modules, see the configuring aids for ET 200M

Configuring ET 200M

Ordering data	Order No.	Specs/Requirements			Power Consumption from backplane bus
IM 153-1 interface module	**6ES7 153-1AA02-0XB0**	1 Slot	Accessories: 5	Slot No.2	1000 [1] mA
Digital Input					
16 x 24 V DC	**6 ES7 321-1BH01-0AA0**	1 Slot	Accessories: 5,6	Slots 3-10	25 mA
16 x 24 V DC, source input	**6 ES7 321-1BH50-0AA0**	1 Slot	Accessories: 5,6	Slots 3-10	10 mA
32 x 24 V DC	**6 ES7 321-1BL00-0AA0**	1 Slot	Accessories: 5,6	Slots 3-10	25 mA
16 x 24 V DC	**6 ES7 321-7BH00-0AB0**	1 Slot	Accessories: 5,6	Slots 3-10	55 mA
16 x 120 V AC	**6 ES7 321-1EH01-0AA0**	1 Slot	Accessories: 5,6	Slots 3-10	16 mA
8 x 120/230 V AC	**6 ES7 321-1FF01-0AA0**	1 Slot	Accessories: 5,6	Slots 3-10	29 mA
Digital Output					
16 x 24 V DC; 0.5 A	**6 ES7 322-1BH01-0AA0**	1 Slot	Accessories: 5,6	Slots 3-10	80 mA
32 x 24 V DC; 0.5 A	**6 ES7 322-1BL00-0AA0**	1 Slot	Accessories: 5,6	Slots 3-10	90 mA
8 x 24 V DC; 0.5 A	**6 ES7 322-8BF00-0AB0**	1 Slot	Accessories: 5,6	Slots 3-10	70 mA
16 x 120 V AC; 0.5 A	**6 ES7 322-1EH01-0AA0**	1 Slot	Accessories: 5,6	Slots 3-10	184 mA
8 x 24 V DC; 2 A	**6 ES7 322-1BF01-0AA0**	1 Slot	Accessories: 5,6	Slots 3-10	40 mA
8 x 120/230 V AC; 1 A	**6 ES7 322-1FF01-0AA0**	1 Slot	Accessories: 5,6	Slots 3-10	100 mA
8 x relay output	**6 ES7 322-1HF01-0AA0**	1 Slot	Accessories: 5,6	Slots 3-10	40 mA
16 x relay output	**6 ES7 322-1HH00-0AA0**	1 Slot	Accessories: 5,6	Slots 3-10	100 mA
Digital I/O					
8DI, 8 DO, 24 V DC; 0.5 A	**6 ES7 323-1BH00-0AA0**	1 Slot	Accessories: 5,6	Slots 3-10	40 mA
16 DI, 8 DO, 24 V DC; 0.5 A	**6 ES7 323-1BL00-0AA0**	1 Slot	Accessories: 5,6	Slots 3-10	55 mA
Analog input					
8 x 9 to 14 bits + sign	**6ES7 331-7KF01-0AB0**	1 Slot	Accessories: 5,6	Slots 3-10	60 mA
2 x 9 to 14 bits + sign	**6ES7 331-7KB01-0AB0**	1 Slot	Accessories: 5,6	Slots 3-10	60 mA
Analog output					
4 x 11 bits + sign	**6ES7 332-5HD01-0AB0**	1 Slot	Accessories: 5,6	Slots 3-10	60 mA
2 x 11 bits + sign	**6ES7 332-5HB01-0AB0**	1 Slot	Accessories: 5,6	Slots 3-10	60 mA
Analog I/O					
4 inputs, 2 outputs	**6ES7 334-0CE01-0AA0**	1 Slot	Accessories: 5,6	Slots 3-10	55 mA
Ex digital input [3]					
4 x 24 V DC	**6ES7 321-7RD00-0AB0**	1 Slot	Accessories: 5,6,9	Slots 3-10	80 mA
Ex digital output [3]					
4 x 24 V DC; 10 mA	**6ES7 322-5SD00-0AB0**	1 Slot	Accessories: 5,6,9	Slots 3-10	70 mA
4 x 15 V DC; 20 mA	**6ES7 322-5RD00-0AB0**	1 Slot	Accessories: 5,6,9	Slots 3-10	70 mA
Ex analog input [3]					
4 x 10 to 15 bits + sign	**6ES 331-7RD00-0AB0**	1 Slot	Accessories: 5,6,9	Slots 3-10	60 mA
8/4 for thermocouples, Pt100	**6ES 331-7SF00-0AB0**	1 Slot	Accessories: 5,6,9	Slots 3-10	120 mA
Ex analog output [3]					
4 x 15 bits	**6ES7 332-5RD00-0AB0**	1 Slot	Accessories: 5,6,9	Slots 3-10	80 mA
Function modules					
FM 350-1 counter module [2]	**6ES7 350-1AH01-0AE0**	1 Slot	Accessories: 5,6	Slots 3-10	160 mA
FM 351 positioning module [2]	**6ES7 351-1AH01-0AE0**	2 Slots	Accessories: 5,6	Slots 3-10	180 mA
FM 352 elect.cam control [2]	**6ES7 352-1AH01-0AE0**	2 Slots	Accessories: 5,6	Slots 3-10	100 mA
Simulator module	**6ES7 374-2XH01-0AA0**	1 Slot	Accessories: 5	Slots 3-10	80 mA
Dummy modules	**6ES7 370-0AA01-0AA0**	1 Slot	Accessories: 5	Slots 3-10	5 mA
Power supply					
PS 307; 2A	**6ES7 307-1BA00-0AA0**		Accessories: 5	Slot 1	
PS 307; 5A	**6ES7 307-1EA00-0AA0**		Accessories: 5	Slot 1	
PS 307; 10A	**6ES7 307-1KA00-0AA0**		Accessories: 5	Slot 1	

1) Power feed through backplane bus
2) With S7 masters only
3) Intrinsically safe

Configuring ET 200M (continued)

Accessories

Ordering Data	Order No.	Ordering Data	Order No.
DIN Rail		Labeling strip	**6ES7 392-2XX00-0AA0**
160 mm	**6ES7 390-1AB60-0AA0**	Label cover	**6ES7 392-2X^00-0AA0**
482 mm	**6ES7 390-1AE80-0AA0**		
530 mm	**6ES7 390-1AF30-0AA0**	Front conn., 20 pin; screw contacts	**6ES7 392-1AJ00-0AA0**
830 mm	**6ES7 390-1AJ30-0AA0**	Front conn., 20 pin; spring-loaded cont.	**6ES7 392-1BJ00-0AA0**
2000 mm	**6ES7 390-1BC00-0AA0**	Front conn., 40 pin; screw contacts	**6ES7 392-1AM00-0AA0**
Shield Element	**6ES7 390-5AA00-0AA0**	Cable compartment LK 393	**6ES7 393-4AA00-0AB0**
Shield connecting terminal (2 pieces)			
for 2 cables, ø 2 to 6 mm	**6ES7 390-5AB00-0AA0**		
for 1 cables, ø 3 to 8 mm	**6ES7 390-5BA00-0AA0**		
for 1 cables, ø 4 to 13 mm	**6ES7 390-5CA00-0AA0**		

Application

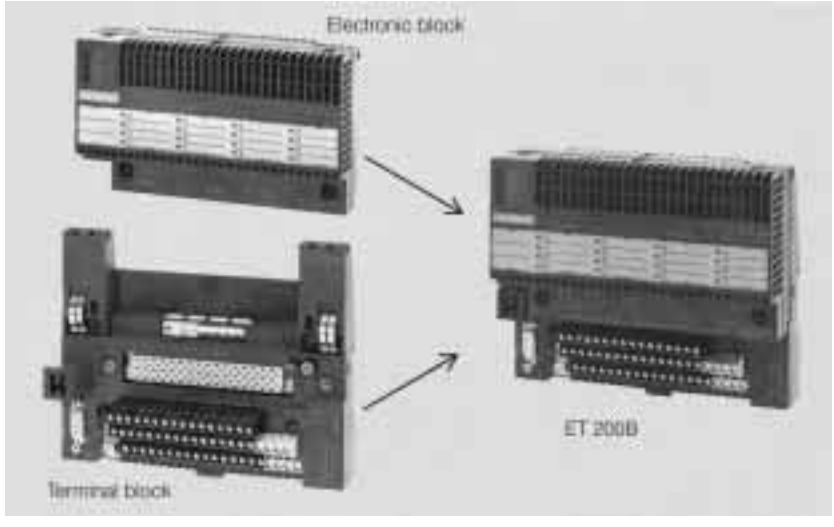


Fig. 4/5 Compact ET 200B I/O block

The ET 200B is a small, compact I/O block with small mounting depth and degree of protection IP 20.

Numerous analog and digital input/output modules are available.

The ET 200B is primarily used in areas requiring few inputs/outputs or where only a small mounting depth is available.

The ET 200B is a passive station (slave) connected to the PROFIBUS-DP fieldbus.

The maximum data transfer rate is 12 Mbit/s.

4

Design

The compact ET 200B I/O consists of:

- Terminal block and
- Electronics block.

The interface module to PROFIBUS-DP is already integrated in the electronics block.

Terminal block

The terminal block accommodates the electronics block. The wiring is attached to the terminal block, thus no cables need be separated when the electronics block is replaced. The terminal block can be mounted on flat surfaces or on a standard DIN rail.

The unit can be mounted horizontally and vertically.

The following terminal blocks are available:

- Terminal blocks for 24 V DC with screw-type terminals: TB1/DC, TB1-4/DC, TB2/DC, TB2-4/DC.
- Terminal blocks for 24 V DC with spring-type terminals: TB3/DC, TB4/DC, TB3-4/DC, TB4-4/DC.
- Terminal block for 120/230 V AC with screw-type terminals: TB6/AC.
- Terminal block for analog electronics blocks with spring-type terminals: TB8.

There are terminal blocks for 3-wire and 4-wire connection. In the case of 3-wire connection, the input/output signals are assigned to one terminal block. The 24 V supply voltage (24 V DC, ground) is applied to the 2nd and 3rd terminal strips.

Terminal blocks with 4/tier terminals also have a channel-by-channel PE connection in the 4th terminal strip.

Electronics block

The electronics blocks contain the digital and analog input and output channels.

The following digital electronics blocks are available for 24V DC:

- 16DI; with 16 inputs.
- 32DI; with 32 inputs, input delay 3ms or 0.2 ms.
- 16DO; with 16 outputs for 2A/0.5 A or 2A.
- 32DO; with 32 outputs for 0.5 A.
- 24DI/8DO; with 24 inputs and 8 outputs for 0.5A, input delay 3 ms or 0.2 ms.
- 16DI/16DO; with 16 inputs and 16 outputs for 0.5 A.
- 8RO; 24 V to 60 V DC with 8 relay contacts.
- 8DI/8DO; with 8 inputs and 8 outputs for 0.5 A.
- 8DI/8DO; with integrated hardware disable.

ET 200B (continued)

Design (continued)

The following digital electronics blocks are available for 120/230 V AC:

- 16DI; with 16 inputs
- 16DO; with 16 outputs for 0.5 A
- 16 RO; with 16 relay outputs
- 8DI/8RO; with 8 inputs and 8 relay outputs

The following analog electronics blocks are available:

- 4/8AI; with 4/8 inputs; ±80 mV; ±250 mV; ±500 mV; ±1000 mV; Pt100, Ni100, thermocouples.
- 4A1; with 4 inputs; ±1.25 V; + 2.5V; ±10V; 0 (4) to 20 mA.
- 4A0; with 4 outputs; ±10V; +10V; ±20 mA; 0 (4) to 20 mA.

A compensation box is also required to connect thermo-couples to analog electronics blocks.

Addressing

The address of the compact ET200B I/O station is set on the terminal block using two decimal switches.

Principle of operation

The inputs and outputs of the compact ET 200B block can be accessed from the user program in the programmable controller in the same manner as the inputs and outputs of the central controller.

The communication across PROFIBUS is handled completely by the master interface module in the central controller and the integrated PROFIBUS-DP interface in the ET 200B.

Trouble-free ET 200B operation is verified by way of diagnostic functions.

The ET 200B diagnostics:

- Short-circuits (outputs)
- Bus errors, i.e. faulty data transmission and
- 24 V DC load voltage supply.

The diagnostic data is evaluated as follows:

- At the block by the dignostic LED on the ET 200B
- At the block with direct connection of a programming device or PC with COM PROFIBUS parameterization software (included in both TISOFT and SoftShop programming packages)
- At the block with direct connection of an ET 200 handheld unit
- Centrally via the CPU in the programmable controller with the STEP 5 and STEP 7 user program

ET 200B with hardware disable

One version of the digital 8DI/8DO modules allows the outputs to be disabled directly as a result of a parameterizable signal level of a corresponding input.

This allows a fast, reproducible response to time critical events.

Parameterization

When an ET 200B is connected to master modules not parameterized with COM PROFIBUS (operation on third-party master modules), a fixed pre-assigned GSD file can be loaded into the configuring tool of the third-party manufacturer and can be used for simple parameterization of the station.

ET 200B (continued)

Technical specifications

Electronics blocks (digital inputs)		6ES7 131-0BH00-0XB0	6ES7 131-0BL00-0XB0	6ES7 131-0BL10-0XB0	6ES7 131-0HF00-0XB0
Number of inputs		**16**	**32**	**32**	**16**
Isolation		No	No	No	Yes
Input voltage U_E					
• Rated value		**24 V DC**	**24 V DC**	**24 V DC**	**120/230 V AC**
• For signal "0"		-30 to +5 V	-30 to +5 V	-30 to +5 V	0 to 40 V
• For signal "1"		+13 to 30 V	+13 to 30 V	+13 to 30 V	+85 to 264 V
Input current with signal "1"		4 mA	4 mA	4 mA	3 to 16 mA
Delay of inputs		2 to 3.5 ms	3 ms	0.2 ms	0 to 25 ms
Data transfer rate	max.	12 Mbit/s	12 Mbit/S	12 Mbit/S	12 Mbit/s
Cable length	max.	100 m	100 m	100 m	600 m
Sensor supply					
• Voltage		18.5 to 30 V	18.5 to 30V	18.5 to 30 V	—
• Current		0.5 A	1 A	1 A	—
Terminal block		TB1/DC, TB1-4/DC, TB3/DC, TB3-4/DC	TB2/DC, TB2-4/DC, TB4/DC, TB4-4/DC	TB2/DC, TB2-4/DC, TB4/DC, TB4-4/DC	TB6/AC

Electronics blocks (digital outputs)		6ES7 132-0BH01-0XB0	6ES7 132-0BH11-0XB0	6ES7 132-0BL01-0XB0	6ES7 132-0HF00-0XB0
Number of outputs		**16**	**16**	**32**	**16**
Isolation		No	Yes	Yes	Yes
Output voltage U_A					
• Rated value		**24 V DC**	**24 V DC**	**24 V DC**	**120/230 V AC**
• With signal "0"	max.	2 V (no load)	2 V (no load)	2 V (no load)	—
• With signal "1"	min.	U_E -3V	U_E -3V	U_E -3V	—
Output Current		2 x 2 A and 6 x 0.5 A per group	2 A; in groups of 4 4 x 2 A	0.5 A; in groups of 8 8 x 0.5 A	0.5 A in groups of 4
Total current per group	max.	4 A	4 A	2 A	—
Short-circuit protection		Electronic	Electronic	Electronic	Electronic
Data transfer rate	max.	12 Mbit/s	12 Mbit/s	12 Mbit/s	12 Mbit/s
Cable length	max.	100 m	100 m	100 m	600 m
Switching frequency					
• With resistive load	max.	100 Hz	100 Hz	100 Hz	10 Hz
• With inductive load	max.	0.5 Hz	0.5 Hz	0.5 Hz	0.5 Hz
• With lamp load	max.	8 Hz	8 Hz	8 Hz	1 Hz
Terminal block		TB1/DC, TB1-4/DC, TB3/DC, TB3-4/DC	TB2/DC, TB2-4/DC, TB4/DC, TB4-4/DC	TB2/DC, TB2-4/DC, TB4/DC, TB4-4/DC	TB6/AC

Electronics blocks (mixed module)		6ES7 133-0BN01-0XB0	6ES7 133-0BN11-0XB0	6ES7 133-0BH01-0XB0	6ES7 133-0HH00-0XBO[1)]
Number of inputs		**24**	**24**	**8**	**8**
Isolation		No	No	No	Yes
Input voltage U_E					
• Rated value		**24 V DC**	**24 V DC**	**24 V DC**	**120/230 V AC**
• For signal "0"		-30 to +5 V	-30 to +5 V	-30 to +5 V	0 to 40 V
• For signal "1"		+13 to 30 V	+13 to 30 V	+13 to 30 V	+85 to 264 V
Input current with signal "1"		4 mA	4 mA	4 mA	3 to 16 mA
Delay of inputs		3 ms	0.2 ms	2 to 3.5 ms	0 to 25 ms
Cable length	max.	100 m	100 m	100 m	600 m
Data transfer rate	max.	12 Mbit/s	12 Mbit/S	12 Mbit/S	12 Mbit/s
Number of outputs		8	8	8	8 (relay; 2 high-current and 6 low-current)
Isolation		Yes	Yes	No	Yes
Output voltage U_A					
• Rated value		**24 V DC**	**24 V DC**	**24 V DC**	**120 V AC 24 to 150 V DC**
• With signal "0"	max.	2 V (no load)	2 V (no load)	2 V (no load)	—
• With signal "1"	min.	U_E -3V	U_E -3V	U_E -3V	—
Output Current		0.5 A; in one group	0.5 A; in one group	0.5 A; in one group	4 A (2 connections0 2 A (6connections)
• Total current per group	max.	2 A	2 A	2 A	—
• Total switching current	max.	—	—	—	16 A
Short-circuit protection	max.	Electronic	Electronic	Electronic	No
Switching Frequency					
• With resistive load	max.	100 Hz	100 Hz	100 Hz	10 Hz
• With inductive load	max.	0.5 Hz	0.5 Hz	0.5 Hz	2 Hz
• With lamp load	max.	8 Hz	8 Hz	8 Hz	—
Cable length	max.	100 m	100 m	100 m	100 m
Terminal block		TB2/DC, TB2-4/DC, TB4/DC, TB4-4/DC	TB2/DC, TB2-4/DC, TB4/DC, TB4-4/DC	TB1/DC, TB1-4/DC, TB3/DC, TB3-4/DC	TB6/AC

[1] 230 V AC (24 V to 150 V DC) available soon

ET 200B (continued)

Technical specifications (continued)

Electronics blocks (mixed module) (continued)		**6ES7 133-0BL00-0XB0**
Number of inputs		**16**
Isolation		No
Output voltage U_E		
• Rated value		**24 V DC**
• For signal "0"	max.	-30 to + 5 V
• For signal "1"	max.	+ 13 to 30 V
Input current with Signal "1"		4 mA
Delay of inputs		3 ms
Cable length	max.	100 m
Data transfer rate	max.	12 Mbit/s
Number of outputs		**16**
Isolation		Yes
Output voltage $U_{A,}$ rated value		**24 V DC**
Output current		0.5 A; in groups of 8
		8 x 0.5 A per group
• Total current per group	max.	2 A
Short-circuit protection	max.	Electronic
Switching Frequency		
• With resistive load	max.	100 Hz
• With inductive load	max.	0.5 Hz
• With lamp load	max.	8 Hz
cable length	max.	100M
Terminal block		TB2/DC, TB2-4/DC, TB4/DC, TB4-4/DC

Electronics blocks (relay modules)		**6ES7 132-0GF00-0XB0**	**6ES7 132-0HH00-0XB0[1)]**
Number of outputs		**8** (relays)	**16** (relays; 4 high-current and 12 low-current)
Isolation		Yes; in grous pf 1	Yes, in groups of 1
Output voltage U_A			
• Rated value		**24 V to 60 V DC**	**120 V AC** **61 to 150 V DC**
Output current		2A with 24 V DC	4 A (2 connections) 2 A (12 connections)
Short-circuit protection		No	No
Data transfer rate	max.	12 Mbit/s	12 Mbit/s
Cable length	max.	100 m	600 m
Switching frequency			
• Resistive	max.	10 Hz	10 Hz
• Inductive	max.	2 Hz	2 Hz
Terminal block		TB1/DC, TB1-4/DC, TB3/DC, TB3-4/DC	TB6/AC

Electronics blocks (analog inputs/outputs)		**6ES7 134-0KH01-0XB0**	**6ES7 134-0HF01-0XB0**	**6ES7 134-0HF01-0XB0**
Number of inputs		**8** (voltage/thermocouples or **4** (Pt 100, Ni 100)	**4**	—
Input ranges		±80 mV; ±250 mV; ±500 mV	±1.25 V, ±2.5 V; ±5 V,	—
		±1000 mV; Ni 100, Pt 100	±10 V; 0 (4) to 20 mA	—
		thermocouples type J, K, L, E, N, T, U, R meas.	**±20 mA**	
Isolation		No	No	—
Input resistance				
• Voltage measurement	min.	**10 MΩ**	**100 kΩ**	—
• Current measurement		—	**125 Ω**	
Resolution		11 bit am't. + sign	11 bit am't. + sign	—
		12 bit two's compl.	12 bit two's compl.	—
Measuring and conversion principle		Integrating voltage/ time conversion	Successive approximation	—
Encoding time		2.5/16.7/20/100 ms parameterizable	Max. 0.1 ms/channel	—
Overrange		17.5%	—	—

[1] 230 V AC (61 V to 150 V DC) available soon

ET 200B (continued)

Technical specifications (continued)

Electronics blocks (digital inputs) Analog inputs/output (continued)		**6ES7 134-0KH01-0XB0**	**6ES7 134-0HF01-0XB0**	**6ES7 135-0HF01-0XB0**
Data transfer rate	max.	12 Mbit/s	12 Mbit/s	12 Mbit/s
Cable length	max.	100 m	100 m	100 m
Number of outputs		—	—	**4**
Output ranges				±10 V; +10V; ±20 mA; 0 (40) to 20 mA
Isolation				No
Load resistance	max.	—	—	300Ω
Resolution		—	—	11 bit two's compl.
Conversion time		—	—	1 ms/channel
Overrange		—	—	17.5%
Short-circuit protection		—	—	Electronic
Type of connection		2 wire and 4 wire systems	2 wire system	2 wire and 4 wire systems
Terminal block		TB8	TB8	TB8

Terminal block and Electronics block	**TB1/DC, TB1-4/DC, TB3/DC, TB3-4/DC**	**TB2/DC, TB2-4/DC, TB4/DC, TB4-4/DC**	**TB6/AC**	**TB8**
Supply voltage	**24 V DC**	**24 V DC**	**120/230 V AC**	**24 V DC**
• Rated value	18.5 to 30 V	18.5 to 30 V	85 to 264 V	18.5 to 30 V
• Permissable range (including ripple)				
Connection method	TB1: screw-type terminals TB3: spring-type terminals	TB2: screw-type terminals TB4: spring-type terminals	Screw-type terminals	Spring-type terminals
Isolation between electronics block and PROFIBUS-DP	Yes	Yes	Yes	Yes
Current consumption with 24 V DC				
• Internal (logic) approx.	100 to 170 mA	100 to 200 mA	60 to 210 mA	70 to 100 mA
Ambient temperature	0 to 60˚ C/ 32˚F to 140˚F	0 to 60˚ C/ 32˚F to 140˚F	0 to 60˚ C/ 32˚F to 140˚F	0 to 60˚ C/ 32˚F to 140˚F
Degree of protection	IP 20	IP 20	IP 20	IP 20
Dimensions (WxHxD) in mm/in	160 x 130 x 59/ 6.24 x 5.07 x 2.3	235 x 130 x 50/ 9.1 x 5.07 x 2.3	235 x 130 x 59/ 9.1 x 5.07 x 2.3	160 x 130 x 59/ 6.24 x 5.07 x 2.3
Weight (complete) approx.	0.6 kg	0.8 kg	0.8 kg	0.6 kg

Technical specifications general

Transmission rate max.	12 Mbit/s	Degree of protection	IP 20
Suitable electronics blocks	* Digital inputs • Digital outputs • Digital inputs/outputs • Analog inputs • Analog outputs	Ambient temperature on vertical wall (preferred mounting position) • With horizontal mounting • With other mounting	0 to 60˚C/32˚F to 140˚F 0 to 40˚C/32˚F to 104˚F
Connections	Screw-type and spring-loaded connections, fixed wiring: 3-wire and 4-wire connections.	Relative humidity	15 to 95% (RH severity level 2 in accordance with IEC 1131-2)
Galvanic isolation	Yes, between PROFIBUS-DP and internal electronics	Atmospheric pressure	795 to 1080 hPa
Supply voltage	24 V DC 120/230 V AC	Mechanical stress • Vibrations	IEC 68, Part 2-6 10-57 Hz (const. amplitude 0.075 mm) 57-150 Hz (constant acceleration 1 g)
		• Shock	IEC 68, Part 2-27 half-sine, 15 g. 11 ms

ET 200B (continued)

Ordering data

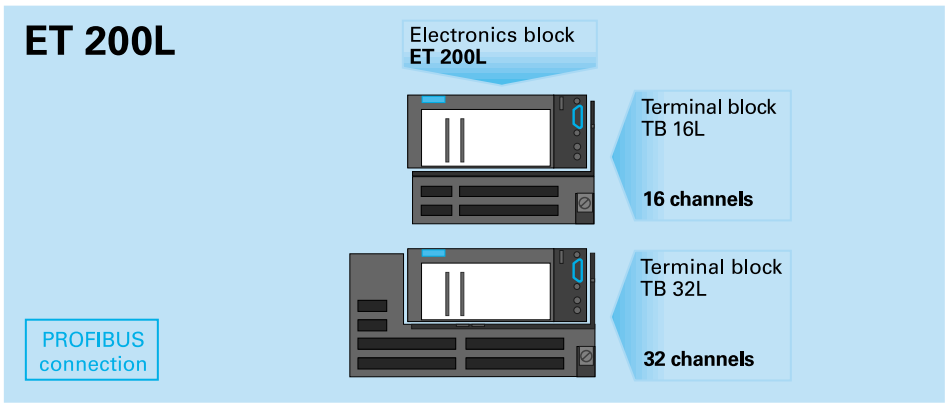
Terminal block	
TB1/DC with 3 tier screw-type terminals[1] for digital 24 V DC electronics blocks with a width of 160 mm (e.g. 16DI)	**6ES7 193-0CA10-0XA0**
TB1-4/DC with 4-tier screw-type terminals[2] for digital 24 V DC electronics blocks with a width of 160 mm (e.g. 16DI)	**6ES7 193-0CA20-0XA0**
TB2/DC with 3-tier screw-type terminals[1] for digital 24 V DC electronics blocks with a width of 235 mm (e.g. 32DI)	**6ES7 193-0CB10-0XA0**
TB2-4/DC with 4-tier screw-type terminals[2] for digital 24 V DC electronics blocks with a width of 235 mm (e.g. 32DI)	**6ES7 193-0CB20-0XA0**
TB3/DC with 3-tier spring-type terminals [1] for digital 24 V DC electronics blocks with a width of 160 mm (e.g. 16DI)	**6ES7 193-0CA30-0XA0**
TB3-4/DC with 4-tier spring-type terminals[1] for digital 24 V DC electronics blocks with a width of 160 mm (e.g. 16DI)	**6ES7 193-0CA4X0-0XA0**
TB4DC with 3-tier spring-type terminals[1] for digital 24 V DC electronics blocks with a width of 235 mm (e.g. 32DI)	**6ES7 193-0CB30-0XA0**
TB4-4/DC with 4-tier spring-type terminals[1] for digital 24 V DC electronics blocks with a width of 235 mm (e.g. 32DI)	**6ES7 193-0CB40-0XA0**
TB6/AC with 3-tier screw-type terminals[1] for digital 24 V DC electronics blocks with a width of 235 mm	**6ES7 193-0CC10-0XA0**
TB8 with spring-type terminals[1] for electronics blocks with analog inputs/outputs (analog terminal block)	**6ES7 193-0CD40-0XA0**
Bus connection plug for PROFIBUS	
Max. data trans.rate 12 Mbit/s, degree of protection IP 20; with vertical outgoing cable	
• without PG port	**6ES7 972-0BA10-0XA0**
• with PG port	**6ES7 972-0BB10-0XA0**
Mini fuse for terminal blocks (10 of each)	
• TR5-T; 1.6 A/125 V for TB1/DC, TB1-4/DC, TB#/DC, TB8	**6ES7 193-0DA00-0XA0**
• TR5-T; 2.5 A/250 V for TB2/DC, TB2-4/DC, TB4/DC	**6ES7 193-0DB00-0XA0**
• TR5-T; 1.0 A/250 V for TB6/AC	**6ES7 193-0DC00-0XA0**
Shield connection element Auxiliary part for terminal block TB8; allows large-area shield connection with analog signals	**6ES7 193-0CD40-7XA0**
Terminal elements for cable connection to the shield connection element (2 of each); Shield diameter:	
• 2 x 2 to 6mm	**6ES7 390-5AB00-0AA0**
• 1 x 3 to 8 mm	**6ES7 390-5BA00-0AA0**
• 1 x 4 to 13 mm	**6ES7 390-5CA00-0AA0**

Electronics block with digital inp./outp. for 24 V DC	
16DI: 16 inputs, width 160 mm	**6ES7 131-0BH00-0XB0**
32DI: 32 inputs, width 235 mm	
• input delay 3 ms	**6ES7 131-0BL00-0XB0**
• Input delay 0.2 ms	**6ES7 131-0BL10-0XB0**
32DO: 32 outputs, width 235 mm	**6ES7 132-0BL01-0XB0**
16DO: with 16 outputs	
• Output current 0.5 A/2A, width 160 mm	**6ES7 132-0BH01-0XB0**
• Output current 2A, width 235 mm	**6ES7 132-0BH11-0XB0**
24DI/8DO; with 24 inputs and 8 outputs, width 235 mm	
• Input delay 3 ms	**6ES7 133-0BN01-0XB0**
• input delay 0.2 ms	**6ES7 133-0BN11-0XB0**
8DI/8DO; with 8 input and 8 outputs, 160 mm width	**6ES7 133-0BH01-0XB0**
8DI/8DO; with 8 inputs and 8 outputs as well as integrated hardward disable of the outputs, width 170 mm	**6ES7 133-0BH10-0XB0**
16DI/16DO; with 16 inputs and 16 outputs, width 235mm	**6ES7 133-0BL00-0XB0**
8RO; with 8 relay outputs 24 to 60 V DC, width 160 mm	**6ES7 132-0GF00-0XB0**
Electronics Block with dig. inp./outp. for 120/230 V AC, width 235 mm	
16DI; with 16 inputs	**6ES7 131-0HF00-0XB0**
16DO; with 16 outputs	**6ES7 132-0HF00-0XB0**
16RO; with 16 relay outputs	**6ES7 132-0HH00-0XB0**
8DI/8RO; with 8 inputs and 8 relay outputs	**6ES7 133-0HH00-0XB0**
Electronics block with analog inputs/outputs, width 160 mm	
4/8AI; with 4/8 inputs ±80 mV; ±250 mV; ±500 mV; ±1000 mV; Pt 100, Ni100, thermocouples type J, K, L, E, N, T, V	**6ES7 134-0KH01-0XB0**
4AI; with 4 inputs; ±1.25 V; ±2.5 V; ±5 V; ±10 V; 0 (4) to 20 mA	**6ES7 134-0HF01-0XB0**
4AO; with 4 outputs ±10 V; +10 V; ±20 mA; 0 (4) to 20 mA	**6ES7 135-0HF01-0XB0**
Labeling strips (DIN A4) For electronics blocks 8DI/8DO, 16 DI and 16 DO (10 of each)	**6ES7 193-0BB00-0XA0**
For electronics blocks 32 DI, 24 DI/8DO, 32 DO and 16DI/16DO (7 of each)	**6ES7 193-0BD00-0XA0**
For electr. blocks 8 RO (10 of each)	**6ES7 193-0BA00-0XA0**
For electr. blocks 16 DO/2A (7 of each)	**6ES7 193-0BC00-0XA0**
For electr. blocks 120/230 V AC (7 of each)	**6ES7 193-0BF00-0XA0**
For analog electr. blocks (10 of each)	**6ES7 193-0BE00-0XA0**
Manual for the ET 200B I/O distributed station	
German	**6ES5 998-4ET11**
English	**6ES5 998-4ET21**
French	**6ES5 998-4ET31**
Spanish	**6ES5 998-4ET41**
Italian	**6ES5 998-4ET51**

[1] Input/Output signals; 24v DC, ground
[2] Input/Output signals; 24v DC, ground; PE

ET 200L

Block I/O not expandable



Block I/O expandable with SIMATIC Smart Connect

One and Two point modular I/O

NEW!

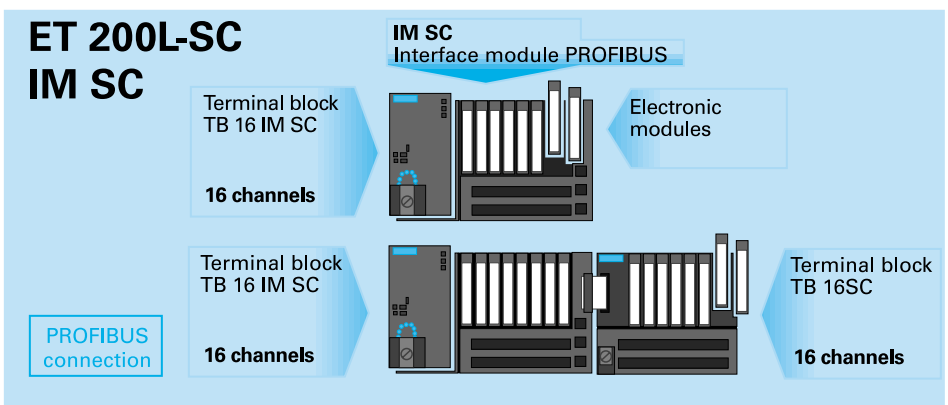


Fig. 4/6 ET 200L complete system

Application

The ET 200L is a small, complact I/O station with enviromental rating IP 20.

The ET 200L is used primarily in areas requiring few inputs/outputs as well as in cases where space is restricted.

The ET 200L is a passive station (slave) connected to the PROFIBUS-DP.

It is available with digital inputs or outputs in 3 form factors:

Block I/O:
ET 200L (Not expandable)

Modular I/O:
ET 200L-SC:

ET 200L terminal block with special electronics block, expandable with one SIMATIC Smart Connect (SC) TB16SC terminal block. This additionally allows discretely modular expansion with up to 16 digital and analog input/output channels.

Finely graded modular I/O
IM SC:

PROFIBUS-DP connection directly to the smart connect (SC) electronic modules. The IM SC terminal block (TB16IM-SC) accommodates 8 SC modules with up to 16 channels of digital or analog signals. The TB 16IM-SC is also expandable to the TB16SC which allows an additional 8 SC modules.

ET 200L (continued)

Design

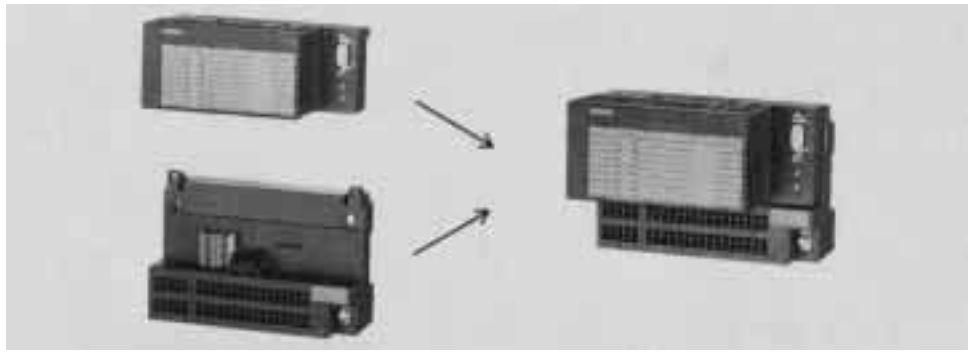


Fig. 4/7 Compact ET 200L I/O station (with 16 channels)

The compact ET 200L I/O block consists of:

- A terminal block and
- An electronics block

Connection to PROFIBUS-DP is integrated into the electronics block. The ET 200L block I/O unit is not expandable.

Terminal block

The terminal block accommodates the electronics block. The wiring is attached to the terminal block so no cables need to be separated when the electronics block is replaced. The terminal block can be mounted on a standard DIN rail.

All mounting positions are permissible in addition to horizontal mounting.

A total of 4 terminal blocks are available for the ET 200L:

- 16 channels with screw-type terminal or spring-type terminals
- 32 channels with screw-type terminal or spring-type terminals.

Electronics block

The electronics blocks contain the digital input and output channels.

The following digital electronics blocks are available for 24 V DC:

- 16 DI; with 16 digital inputs
- 16 DO; with 16 digital outputs 0.5 A
- 32 DI; with 32 digital inputs
- 32 DO; with 32 digital ouputs 0.5 A
- 16 DI/16DO; with 16 digital inputs and 16 outputs 0.5 A each.

PROFIBUS-DP station address

The address of the ET 200L station is set on the electronics block by way of two rotating switches.

Termination of the bus system cable

If the ET 200L is used at the end of a bus segment, it requires a bus connector with terminating resistor (e.g. 6ES7 972-0B ☐20-0XA0).

Accessories

Labeling sheets (DIN A4) suitable for laser printing are available as accessories.

The terminal blocks come with 2-wire connections as standard. Optional supplementary latching terminals enable the use of 3- or 4-wire connections.

Principle of operation

The inputs/outputs of the compact ET 200L I/O block can be accessed from the user program in the programmable controller in the same manner as the inputs and outputs of the central controller.

The communication across PROFIBUS is handled completely by the master interface module in the central controller and the integrated PROFIBUS-DP interface in the ET 200L..

Trouble-free ET 200L operation is verified by way of diagnostic functions.

The ET 200L diagnostics:

- Bus errors, i.e. errored data transfer
- Modules faults and
- 24 V DC load voltage supply

The diagnostic data are evaluated as follows:

- At the block by the diagnostic LED on the ET 200L;
- Centrally with programming devices or PC with the COM PROFIBUS or STEP 7 parameterization software
- Centrally via the CPU in the programmable controller.

ET 200L (continued)

Parameter assignment

When the device is connected to master modules not parameterized with COM PROFIBUS or STEP 7 (operation on third-party master modules), a fixed pre-assigned GSD file can be created with COM PROFIBUS from Version 3.1

This file is then loaded into the configuring tool of the third-party manufacturer and can be used for simple parameterization of the station.

Technical specifications, general

Connection method	Screw-type and spring type method hard wired; Standard: 2-wire method Optional: 3 and 4-wire method	Relative humidity	5 to 95% (RH severity level 2 in accordance with IEC 1131.2)
Data transmission rate max.	1.5 Mbit/s	Atmospheric pressure	795 to 1080 hPA
Isolation	Yes, between PROFIBUS-DP and internal electronics	Mechanical stress • Vibration	IEC 68 Part 2-6 10-57 Hz (constant amplitude 0.075 mm) 57-150 Hz (constant acceleration 1 g)
Supply voltage	24 V DC, reverse polarity protection		
Type of protection	IP 20	• Shock	Half-sine, 15 g. 11 ms
Ambient temperature on vertical wall (preferred mounting position) • With horizontal installation • With vertical installation	 0 to 60˚C/32˚F to 140˚F 0 to 40˚C/32˚F to 104˚F		

Technical specifications ET 200L electronics blocks

Electronics blocks (digital inputs)	6ES7 131-1BH00-0XB0	6ES7 131-1BL00-0XB0
Number of inputs	**16**	**32**
Isolation	No	No
Input Voltage U_E		
• Rated value	**24 V DC**	**24 V DC**
• For signal "0"	-30 to +5 V	-30 to +5 V
• For signal "1"	+13 to 30 V	+13 to 30 V
Input current with signal "1" typ.	5 mA	5 mA
Delay of inputs	2 to 4.5 ms	2 to 4.5 ms
Data transfer rate max.	1.5 Mbit/s	1.5 Mbit/s
Cable length max.	100m	100m
Sensor supply		
• Voltage	18.5 to 30 V	18.5 to 30 V
• Current	0.5 A	0.5 A
Terminal block	TB16L	TB 32L

Electronics blocks (digital inputs)	6ES7 131-1EH00-0XB0
Number of inputs	16
Isolation	Yes
Output voltage U_A	
• Rated Value	120 V AC
• With signal "0"	0 to 20 V
• With signal "1"	74 to 132 V
Input current with signal "1" typ.	9 to 27 mA
Delay of inputs	2 to 25 ms
Data transfer rate max.	1.5 Mbit/s
Cable length max.	1000 m
Terminal block	TB 16L AC

ET 200L (continued)

Technical data ET 200L electronics blocks (continued)

Electronics blocks (digital outputs)		6ES7 132-1BH00-0XB0	6ES7 132-1BL00-0XB0
Number of outputs		**16**	**32**
Isolation		No	Yes
Output voltage U_E			
• Rated value		**24 V DC**	**24 V DC**
• With signal "0"	max.	2 V (no-load)	2 V (no-load)
* With signal "1"	min.	U_E-3V	U_E-3V
Output current			
• With signal "0"	max.	1 mA	1 mA
• With signal "1"	max.	0.5 A	0.5 A
Aggregate current per group	max.	4 A	4 A
Short circuit protection		Electronic	Electronic
Data transmission rate	max.	1.5 Mbit/s	1.5 Mbit/s
Cable length	max.	100 m	100 m
Switching frequency			
• with resistive load	max.	100 Hz	100 Hz
• with inductive load	max.	0.5 Hz	0.5 Hz
• with lamps	max.	8 Hz	8 Hz
Terminal block		TB16L	TB32L

Electronics blocks (digital outputs)		6ES7 132-1EH00-0XB0
Number of outputs		**16**
Isolation		Yes
Output voltage U_A		
• Rated value		**120 V AC**
• With signal "1"	max.	U_E-1.5 V
Output current		
• With signal "0"	max.	2.6 mA
Load current per output	max.	1 A
Short circuit protection		No
Data transmission rate	max.	1.5 Mbit/s
Cable length	max.	1000 m
Switching frequency		
• with resistive load	max.	10 Hz
• with inductive load	max.	0.5 Hz
• with lamps	max.	1 Hz
Terminal block		TB 16L AC

Electronics blocks (mixed module)		6ES7 133-1BL00-0XB0	6ES7 133-1EH00-0XB0
Number of inputs		**16**	**8**
Isolation		No	Yes
Output voltage U_E			
• Rated value		**24 V DC**	**120 V AC**
• For signal "0"		-30 to + 5 V	
• For signal "1"		+13 to 30 V	L -1.5 V
Input current with signal "1"	typ.	5 mA	9 to 27 mA
Delay of inputs		2 to 4.5 ms	2 to 2.5 ms
Cable length	max.	100 m	1000 m
Data transmission rate	max.	1.5 Mbit/s	1.5 Mbit/s
Number of outputs		**16**	**8**
Isolation		No	No
Output voltage U_A			
• Rated value		**24 V DC**	**120 V AC**
• With signal "0"	max.	2 V (no-load)	—
• With signal "1"	min.	U_E - 3 V	U_E - 1.5 V
Output current			
• With signal "0"	max.	1 mA	2.6 mA
• With signal "1"	max.	0.5 A	—
Aggregate current per group	max.	4A	—
Short circuit protection		Electronic	No
Data transmission rate	max.	1.5 Mbit/s	1.5 Mbit/s
Cable length	max.	100 m	1000 m
Switching frequency			
• with resistive load	max.	100 Hz	100 Hz
• with inductive load	max.	0.5 Hz	0.5 Hz
• with lamp	max.	8 Hz	8 Hz
Terminal block	max.	TB 32L	TB 16L AC

Design

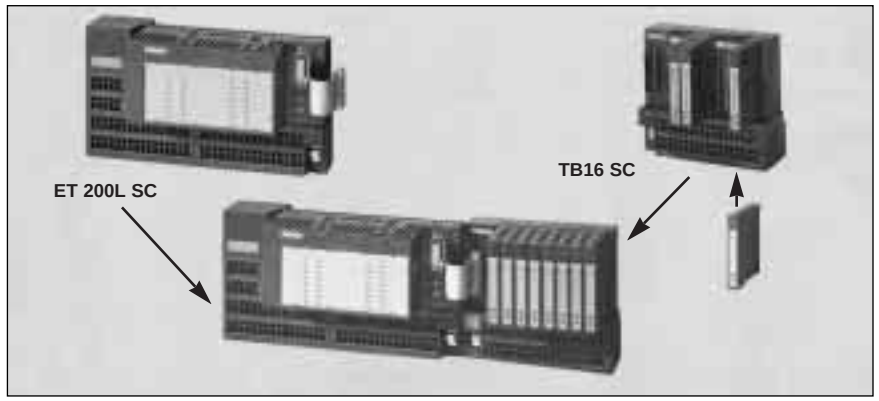


Fig 4/8 Compact ET 200L-SC I/O station (ET 200L with 32 channels)

The design of the ET 200L-SC is the same as that of the ET 200L; it comprises a terminal block and an electronics block. In contrast to the ET 200L, it can be expanded with a Smart Connnect terminal block (TB16 SC).

Connection to PROFIBUS-DP is already integrated into the electronics block.

Smart Connect terminal block (TB16 SC)

The TB16 SC allows 8 Smart Connect (SC) modules with up to 16 digital and analog input/output channels.

Digital and analog modules can be plugged into the TB16 SC in a mixed arrangement.

The ET 200L-SC can thus be adapted to any automation needed due to its bit modular functionality.

The connecting cable between the ET 200L-SC and the TB16 SC is supplied with the TB16 SC terminal block.

Electronics block

The electronics block contains the digital input and output channels.

The following digital electronics blocks are available:

- 16DI; with 16 digital inputs
- 16DO; with 16 digital outputs 0.5 A
- 32 DI; with 32 digital inputs
- 16DI/16DO; with 16 digital inputs and 16 outputs 0.5 A each.

The terminal diagram required for wiring is printed on the electronics block.

Accessories

Labeling sheets suitable for laser printing are available as accessories.

All ET 200L terminal blocks have a two-wire connection system. As an option, the three or four-wire connection system is also possible by means of latching auxiliary terminals.

Shield terminals to connect the shield for analog signals are available as an additional accessory.

Principle of operation and parameter assignment

The ET 200L-SC allows for highly modular adaptations for each station.

The communication is handled across PROFIBUS completely by the master interface module in the central controller and the integrated PROFIBUS-DP interface in the ET 200L-SC.

When an ET 200L-SC is connected to master modules not parameterized with COM PROFIBUS or STEP 7 (third-party master modules), a *.GSD file can be created using COM PROFIBUS version 3.1 that will handle the modularity of the SC modules. This *.GSD file can be loaded into a configuration tool of a third-party manufacturer and can be used for simple parameterization of the station.

ET 200L-SC (continued)

Technical specifications ET 200L-SC electronics blocks

Electronics blocks (digital inputs)		6ES7 131-1BH11-0XB0	6ES7 131-1BL11-0XB0
Number of inputs		16	32
Input voltage U_E			
• Rated value		24 V DC	24 V DC
• for signal "0"		-30 to + 5 V	-30 to + 5 V
• for signal "1"		+13 to 30 V	+13 to 30 V
Input current with signal "1"	typ.	5 mA	5 mA
Delay of inputs		2 to 4.5 ms	2 to 4.5 ms
Data transmission rate	max.	1.5 Mbit/s	1.5 Mbit/s
Cable length	max.	100 m	100 m
Sensor supply			
• voltage		18.5 to 30 V	18.5 to 30 V
• current		0.5 A	0.5 A
Terminal block		TB16L	TB32L
Expansion		Digital and analog with SIMATIC SC	Digital and analog with SIMATIC SC

Electronics blocks (digital outputs)		6ES7 132-1BH11-0XB0
Number of outputs		16
Input voltage U_A		
• Rated value		24 V DC
• with signal "0"	max.	2V (no-load)
• with signal "1"	min.	U_E-3V
Output current		
• with signal "0"	max	1 mA
• with signal "1"	max.	0.5 A
Aggregate count per group	max.	4A
Short circuit protection		Electronic
Data transmission rate	max.	1.5 Mbit/s
Cable length	max.	100 m
Switching frequency		
• with resistive load	max.	100 Hz
• with inductive load	max.	0.5 Hz
• with lamps	max.	8 Hz
Terminal block		TB16L
Expansion		Digital and analog with SIMATIC SC

Electronics blocks (mixed module)		6ES7 133-1BL10-0XB0
Number of inputs		16
Input voltage U_E		
• Rated value		24 V DC
• for signal "0"		-30 to + 5 V
• for signal "1"		+13 to 30 V
Input current with signal "1"	typ.	5 mA
Delay of inputs		2 to 4.5 ms
Cable length	max.	100 m
Data transmission rate	max.	1.5 Mbit/s
Number of outputs		16
Isolation		No
Output voltage U_A		
• Rated value		24 V DC
• with signal "0"	max.	2 V (no-load)
• with signal "1"	max.	U_E -3V
Output current		
• with signal "0"	max.	1 mA
• with signal "1"	max.	0.5 A
Aggregate current per group	max.	4A
Short circuit protection		Electronic
Data transmission rate	max.	1.5 Mbit/s
Cable length	max.	100 m
Switching frequency		
• with resistive load	max.	100 Hz
• with inductive load	max.	0.5 Hz
• with lamps	max.	8 Hz
Terminal block		TB32L
Expansion		Digital and analog with SIMATIC SC

ET 200L-SC (continued)

Technical specifications terminal block for ET 200L and ET 200L-SC

Terminal block		ET 200L with TB 16L	ET 200L-SC with TB 16L	ET 200L with TB 16L AC [3]	ET200L with TB 32L
Connection method		Screw-type terminals, spring-type terminals (2 wire connection, 3 and 4-wire connection optionally)			
Dimensions (W x H x D)[1] in mm/in		145 x 100 x 75/ 5.6 x 3.9 x 2.92	259[2] x 100 x 75/ 10.10 x 3.9 x 2.92	191 x 100 x 40/ 10.10 x 3.9 x 1.56	191 x 100 x 75/ 10.10 x 3.9 x 2.92
Weight (complete)	approx.	360 g	410 g	283 g	500 g
Current carrying capacity	max.	—	—	—	—

Terminal block		ET 200L-SC with TB 32L	Smart Connect with TB16SC	IM SC with TB 16IM-SC	IM SC without TB 16 IM-SC
Connection method		Screw-type terminals, spring-type terminals (2 wire connection, 3 and 4-wire connection optionally)			
Dimensions (W x H x D)[1] in mm/in		305[2] x 100 x 75/ 11.89 x 3.9 x 2.92	15 x 100 x 75/ 0.58 x 3.9 x 2.92		
Weight (complete)	approx.	550 g	Depending on mod. complement	—	—
Current carrying capacity	max.	—	8A		

1 Depth with electronics block and 7.5 mm DIN rail
2 Width including terminal block TB16 SC
3 No spring-loaded terminals, additional terminals not required.

Technical specifications SIMATIC Smart Connect (SC) electronic module

Electronics modules (digital inputs)		6ES7 121-1BB00-0AA0	6ES7 121-1FA00-0AA0
Number of inputs		2	1
Cable length			
• shielded	max.	1000 m/3,280 ft	1000 m/3,280 ft
Isolation			
• between channels and SC bus		Yes, Optocoupier	Yes
• between the channels		No	—
Permissable potential difference			
• between different circuits		75 V DC/60 V AC	—
• between ground and input		—	240 V AC
Insulation tested with		1500 V AC	2500 V DC
Power losses of the module	typ.	0.4 W	0.6W
Status indication		Green LED per channel	Green LED
Input voltage			
• Rated value		24 V DC	120/230 V AC
• for signal "1"		13 to 30 V	74 to 264 V AC
• for signal "0"		-3 to 5 V	0 to 40 V AC
• Frequency Range		—	47 to 63 Hz
Input current			
• with signal "1"	typ.	7 mA	3.7 mA[1]
• with signal "0"	typ.	—	2.2 mA[1]
Delay of inputs			
• at "0" to "1"		1.2 to 4.8 ms	max. 30 ms
• at "1" to "0"		1.2 to 4.8 ms	max, 30 ms
• Input characteristic after connection of 2-wire BERO's		IEC 1131, Type 1 Possible	IEC 1131, Type 1[1] Possible
• Permissable quiescent current	max.	1.5 mA	1.5 mA
Slot requirements on TB16SC		1 of 8	1 of 8
Terminal block		TB16 SC	TB16SC
Dimensions (W x H x D) in mm/in		10 x 64 x 51/0.39 x 2.49 x 1.98	10 x 64 x 51/0.39 x 2.49 x 1.98
Weight	approx.	15 g	15 g

1 When 2 electronics modules are switched in parallel, IEC 1131-2/type 2 is achieved for 120 V AC.

ET 200L-SC (continued)

Technical specifications, SIMATIC (SC) electronics module (continued)

Electronics modules (digital output)	6ES7 122-1BB00-0AA0	6ES7 122-1BB10-0AA0	6ES7 122-1FA00-0AA0	6ES7 122-1HA00-0AA0
Number of outputs	2	2	1	1
Cable length				
• Shielded max.	1000 m/3,280 ft	1000 m/3,280 ft	1000 m/3,280 ft	1000 m/3,280 ft
Supply voltage of the relay L+	—	—	—	24 V DC
• Reverse polarity protection	—	—	—	Yes
Rated load voltage L+/L1	24 V DC	24 V DC	12/230 V AC	—
• Permissible frequency range	—	—	47 to 63 Hz	—
Isolation				
• between channels and SC bus	Yes, optocoupler	Yes, optocoupler	Yes	Yes
• between channels	No	No	—	—
• between channel and relay supply voltage	—	—	—	Yes
Permissible potential difference				
• between different circuits	75 V DC/60 V AC	75 V DC/60 V AC	—	—
• between ground and output	—	—	240 V AC	—
• between ground and relay supply voltage	—	—	—	75 V DC, 60 V AC
• between ground or relay supply voltage and the output	—	—	—	240 V AC
Insulation tested	1500 V AC	1500 V AC	2500 V DC	—
• between ground and relay supply voltage	—	—	—	1500 V AC
• between ground or relay supply voltage and the output	—	—	—	2500 V DC
Current consumption from relay supply voltage L+	0.3 mA	0.6 mA	—	max. 15 mA
Power losses of the module typ.	0.4 W	0.9 W	0.7 W	0.7 W
Status indication	Green LED per channel	Green LED per channel	Green LED	Green LED
Output voltage				
• with signal "1" min.	L+ (-0.5 V)	L+ (-1.8 A)	L (-1 V)	—
Output current				
• with signal "1"				
Rated value	0.5 A	2 A	1 A	—
Permissable range	5 mA to 0.6 A	—	—	—
- for 0 to 40° C	—	5 mA to 2.4 A	40 mA to 1.1 A	—
- for 40 to 60° C	—	5 mA to 2.4 A	40 mA to 1.1 A	—
- Permissible impulse voltage max.	—	—	10 A (for 2 half waves)	—
• with signal "0" (residual current) max.	0.3 mA	0.6 mA	3 mA	—
Output delay (with resistive load)				
• at "0" to "1" max.	200 µs	200 µs	20 ms	—
• at "1" to "0" max.	1.3 ms	1.3 ms	20 ms	—
Size of the motor starter max.	—	—	Size 8	—
Zero crossing	—	—	with zero crossing switch	—
Lamp load max.	2.5 W	10 W	At 230 V AC: 100 W At 120 V AC: 50 W	—
Thermal constant current	—	—	—	max. 5 A
Minimum load current	—	—	—	1 mA
Internal contact circuit	—	—	—	Varistor, rated voltage 275
Switching frequency max.				
• Mechanical max.	—	—	—	10 Hz
• with resistive load max.	100 Hz	100 Hz	50 Hz	1 Hz
• with inductive load according to IEC 947-5-1, max.	2 Hz at 0.3 A	0.2 Hz at 1A	10 Hz	0.1 Hz
DC 13/AC 15, OC 13/AC 15 max.	0.5 Hz at 0.5 A	0.1 Hz at 2A	10 Hz	0.1 Hz
• with lamp load max.	1 Hz	1 Hz	1 Hz	0.1 Hz
Short circuit protection of the outputs	Yes, Electronic	Yes, Electronic	No	—
Slot requirements	1 of 8	1 of 8	1 of 8	2 of 8
Terminal block	TB 16SC	TB 16SC	TB 16SC	TB 16SC
Dimensions (W x H x D) mm	10 x 64 x 51	10 x 64 x 51	10 x 64 x 51	20 x 64 x 51
Weight approx.	15 g	15 g	15 g	30 g

ET 200L-SC (continued)

Technical specifications, SIMATIC Smart Connector (SC) electronics modules (continued)

Electronics modules (analog input)	6ES7 123-1GB00-0AB0	6ES7 123-1FB00-0AB0	6ES7 123-1JB00-0AB0	6ES7 123-1JA00-0AB0
Number of inputs	2	2	2	1
Cable length				
• Shielded max.	200 m/656 ft.	200 m/656 ft.	50 m/656 ft.	50 m/656 ft.
Supply voltage of the electronics L+	24 V DC	24 V DC	24 V DC	24 V DC
• Reverse polarity protection	Yes	Yes	Yes	Yes
Isolation				
• between channels and SC bus	Yes, Optocoupler	Yes, optocoupler	Yes, optocoupler	Yes, optocoupler
Insulation tested with	1500 V AC	1500 V AC	1500 V AC	1500 V AC
Permissable potential difference				
• between inputs and M (U_{CM})	2 V DC/2 V_{PP} AC	2 V DC/2 V_{PP} AC	2 V DC/2 V_{PP} AC	2 V DC/2 V_{PP} AC
Constant current for resistance-type sensors	—	—	—	approx. 1.5 mA
Current consumption from supply voltate L+	max. 30 mA	max. 30 mA	max. 30 mA	
Power losses of the module typ.	0.6 W	0.6 W	0.6 W	0.6 W
Interference voltage suppression for				
• Common mode interference	> 90 dB	> 90 dB	> 90 dB	> 90 dB
• Series-mode interference (peak value of interference < rated value of the input range)	> 70 dB	> 70 dB	> 70 dB	> 70 dB
Cross-talk between the inputs	> 50 dB	> 50 dB	> 50 dB	> 50 dB
* at 50 Hz/60 Hz	± 1.0%	± 1.0%	± 1.0%	0 to 600Ω ± 1.0% Pt 100 (climatic) 4˚C Pt 100 (standard) 4˚C Ni 100 (standard) 2˚C
Operating error limits (over entire temperature range, referred to rated input range)	± 0.8%	± 0.7%	± 0.8%	0 to 600Ω ± 0.7% Pt 100 (climatic) 1˚C Pt 100 (standard) 4˚C Ni 100 (standard) 2˚C
Basic error limits (operating error limits at 25˚ C, referred to the rated input range)				
Temperature error (referred to rated input range)	± 0.01%/K	± 0.01%/K	± 0.01%/K	± 0.03%/K
Linearity error (related to rated input range)	± 0.05%	± 0.05%	± 0.05%	± 0.05%
Repeated accuracy in settled state at 25˚C, referred to the rated input range	± 0.1%	± 0.1%	± 0.1%	± 0.1%
Measuring principle	Integrating	Integrating	Integrating	Integrating
Intergration and conversion time/resolution per channel				
• Parameterizable	Yes	—	Yes	Yes
• Integration time ms	50 60	60 50	50 60	50 60
• Conversion time ms	55 65	65 55	55 65	110 130
• Cycle time ms	—	—	—	110 130
• Interference voltage suppression for interference frequency f1 Hz	60 50	50 60	50 60	50 60
• Resolution (inc. overrange/ representation in two's complement)				S7 form factor
- ± 20 mA	13 bits			0 to 600Ω 14 bits
- 4 to 20 mA	12 bits			Pt100 clim. 0.1˚C/digit Pt100 stand. 0.1˚C/digit Ni100 stand. 0.1˚C/digit
S7 form factor/S5 form factor				
± 10 V	—	13 bits	—	S5 form factor
1 to 5 V	—	12 bits	—	0 to 600Ω 13 bits
± 80 m V, Type J/K/R ˚C/digit	—	—	14 bits: 0.1/13 bits: 1.0	Pt100 clim. 0.05˚C/digit Pt100 stand. 0.05˚C/digit Ni100 stand. 0.05˚C/digit
Input ranges (rated value)/input resistence	± 20 mA/50 Ω 4 to 20 mA/50 Ω	± 10 mA/100 Ω 1 to 5 V/50 Ω	± 80 mV/> 1 MΩ Type J/1200˚C/> 1MΩ Type K/1372˚C/> 1MΩ Type R/1769˚C/> 1MΩ	0 to 600Ω/> 1 MΩ Pt100 (climatic; -120 to +130˚C)/> 1MΩ Pt100 (standard; -200 to + 850˚C)/> 1MΩ 100 (standard; -60 to + 250˚C)/> 1MΩ
Permissable input current (destruction limit)	40 mA, constant	—	—	—
Permissable input voltage for voltage input (destruction limit)	—	max. 20 V constant; 75 V for up to 1 s (mark-space ration 1:20)	max. 10 V constant; 25 V for up to 1 s (mark-space ration 1:20)	

ET 200L-SC (continued)

Technical specifications, SIMATIC Smart Connector (SC) electronics modules (continued)

Electronics modules (analog input modules) continued	6ES7 123-1GB00-0AB0	6ES7 123-1FB00-0AB0	6ES7 123-1JB00-0AB0	6ES7 123-1JA00-0AB0
Permissable input voltage for resistance thermometers and constant current inputs/outputs (destruction limit)	—	—	—	Max 10V constant 25 V for up to 1 s (mark-space ratio: 1:20)
Connection of signal sensors				
• for voltage measurement	—	—	Possible	
- as 2-wire transducers	Possible; with external transducer feed	—	—	—
- as 4-wire transducers	Possible	—	—	Yes; with compensation of the line resistances for Pt100 in acc. with DIN IEC 751 for Ni100 in acc. with DIN 43760
• or resistance measurement	—	—	—	
- with 4-wire connection				
Characteristic linearization	—	—	Yes, parameterizable Type J; K, R in acc. with IEC584	
Temperature compensation	No	—	Yes;parameterizable	No
Filtering of the measured values	Yes; parameterizable in 4 stages by means of digital filtering	Yes; parameterizable in 4 stages by means of digital filtering	Yes; parameterizable in 4 stages by means of digital filtering	Yes; parameterizable in 4 stages by means of digital filtering
Stage	Time constant	Time constant	Time constant	Time constant
None	1 x cycle time	1 x cycle time	1 x cycle time	1 x cycle time
Weak	8 x cycle time	8 x cycle time	8 x cycle time	8 x cycle time
Medium	64 x cycle time	64 x cycle time	64 x cycle time	64 x cycle time
Strong	128 x cycle time	128 x cycle time	128 x cycle time	128 x cycle time
Slot requirements	1 of 8	1 of 8	1 of 8	1 of 8
Terminal block	TB 16SC	TB 16SC	TB 16SC	TB 16SC
Dimensions (W x H x D) in mm/in	10 x 64 x 51/ 0.39 x 2.49 x 1.98	10 x 64 x 51/ 0.39 x 2.49 x 1.98	10 x 64 x 51/ 0.39 x 2.49 x 1.98	10 x 64 x 51/ 0.39 x 2.49 x 1.98
Weight approx.	20 g	20 g	20 g	20 g

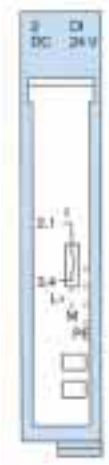
ET 200L-SC (continued)

Technical specifications, SIMATIC Smart Connect (SC) electronics modules (continued)

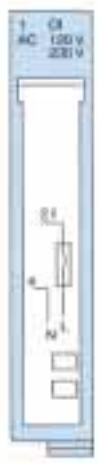
Electronics modules (analog output modules)		6ES7 124-1GA00-0AB0	6ES7 124-1FA00-0AB0
Number of outputs		1	1
Cable length			
• Shielded	max.	200 m/656 ft	200 m/656 ft.
Supply voltage of the electronics L+		24 V DC	24 V DC
• Reverse polarity protection		Yes	Yes
Isolation		Yes	Yes
• between output channel and SC bus		Yes, optocoupler	Yes, optocoupler
Isolation tested with		1500 V AC	1500 V AC
Permissable potential difference			
• between reference point of the load and QV-(U_{CM})	max.	2 V DC/2 V_{PP} AC	—
• between S and QV-(U_{CM})		—	2 V DC/2 V_{PP} AC
Current consumption from supply voltage L+	max.	50 mA	50 mA
Power losses of the module	max.	1W	1W
• Resolution (incl. overrange)		S7 form factor: 0 to 20 mA 4 to 20 mA / S5 form factor: 12 bits 12 bits	S7 form factor: ± 10 V 1 to 5 V / S5 form factor: 12 bits 11 bits
Conversion time	max.	5 ms	5 ms
Setting time			
• for resistive load	ms	0.1	0.1
• for inductive load	ms	0.5	3.3
Substitute values		No	No
• Common mode interference U_{CM}<V_{PP} AC (50 Hz)		> 30 dB	> 30 dB
Operating error limits (over entire temperature range, referred to rated output range)		± 1.0%	± 0.9%
Basic error limits (operator error limits at 25˚C, referred to the rated output range)		± 0.7%	± 0.6%
Temperature error (referred to rated output range)		± 0.01%/K	± 0.01%/K
Linearity error (related to rated output range)		± 0.06%	± 0.06%
Repeat accuracy in settled state at 25˚C, (referred to the rated output range)		± 0.1%	± 0.1%
Output ranges (rated values)	mA	0 to 20 4 to 20	± 10 V 1 to 5 V
Load impedence (within rated range of the output)			
• with common-mode voltage 2 V	max.	500Ω	—
• with common-mode voltage 0 V	max.	600Ω	—
• No load test		Yes	—
• No-Load voltage	approx.	16 V	—
• Inductive load	max.	1 mH	—
Load impedence (within rated range of the output)	min.		1kΩ
• Short-circuit protection		—	Yes
• Short-circuit current	approx.	—	30 mA
• Capactive load	max.	—	1µF
Destruction limit against voltages/currents applied externally			
• Voltage at the outputs to M; QV	max.	15 V constant; 75 V for up to 1 s (mark-space ratio: 1:20)	15 V constant; 75 V for up to 1 s (mark-space ratio: 1:20)
• Current	max.	50 mA DC	50 mA DC
Connection of the actuators		Possible	Possible
- 2-wire connection		—	Possible
- 4-wire connection (measuring line)		2 of 8	2 to 8
Slot requirements		TB 16SC	TB 16SC
Terminal block		20 x 64 x 51/0.78 x 2.49 x 1.98	20 x 64 x 51/0.78 x 2.49 x 1.98
Dimensions (W x H x D) in mm/in		25 g	25 g
Weight	approx.		

Configuring ET 200L, ET 200L-SC (continued)

SIMATIC SC electronics modules



6ES7 121-1BB00-0AA0



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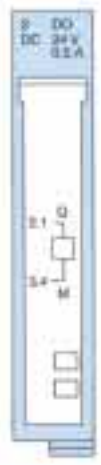

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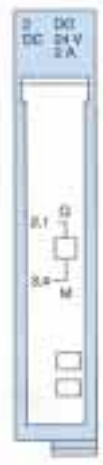

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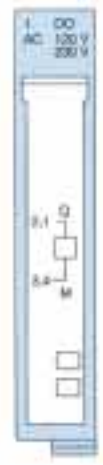
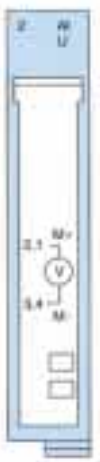


6ES7 122-1FA00-0AA0

6ES7 122-1FA00-0AA0

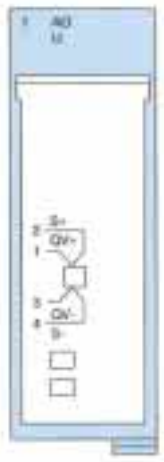
6ES7 123-1GB00-0AB0



6ES7 123-1FB00-0AB0

6ES7 123-1JB00-0AB0

6ES7 123-1JA00-0AB0



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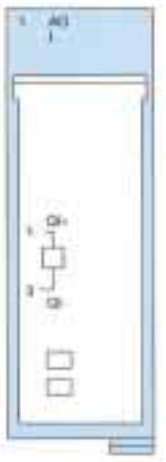


6ES7 124-1GA00-0AB0

Connector pin assignments for the elctronics modules of the SIMATIC SC

4

PROFIBUS-DP Interface IM SC

Design

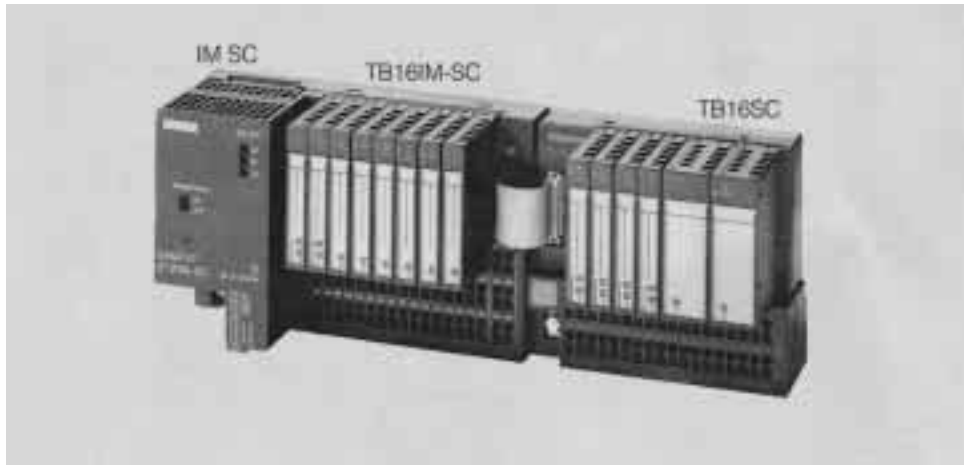


Fig. 4/9 Compact I/O unit ET 200L-SC (ET 200L with 32 channels)

The IM SC is a PROFIBUS-DP interface module which plugs into the TB16 IM-SC terminal block. As for the ET 200L family, the maximum transmission rate is 1.5 Mbit/s. A special DP connector with screw terminals is used for connection to PROFIBUS-DP.

The connector is supplied with the IM SC.

Terminal block (TB16 IM-SC)

The TB16 IM-SC terminal block provides 8 slots for Smart Connect electronic modules and can be extended by one TB16 SC terminal block. Up to 32 SC channels are thus available for linking to PROFIBUS-DP.

The same auxiliary terminals can be latched onto the TB16 IM-SC as onto the TB16 SC. Actuators and sensors with the three or four wire connection system can thus be connected. The TB16 IM-SC is supplied with both screw terminals and spring terminals.

Principle of operation

The IM SC has the possibility of using fast analog modules. Data transmission between the analog SC electronic module and the IM SC has been increased for that purpose. Three analog modules of SIMATIC Smart Connect have a conversion time of less than 3 ms per channel.

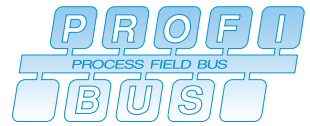
Mixed configurations with a low number of channels per station can be implemented at a low cost with the IM SC. When an IM SC station is connected to master modules not parameterized with COM PROFIBUS or STEP 7 (third-party master modules), a *.GSD file can be created using COM PROFIBUS 3.1 that will handle the modularity of the SC modules. This *.GSD file can be loaded into a configuration tool of a third-party manufacturer and can be used for simple parameterization of the station.

ET 200L complete system

Ordering data	Order No.
Electronics block for ET 200L with digital inputs/ouputs for 24 V DC	
• 16DI	**6ES7 131-1BH00-0XB0**
• 32DI	**6ES7 131-1BL00-0XB0**
• 16DO	**6ES7 132-1BH00-0XB0**
• 32DO	**6ES7 132-1BL00-0XB0**
• 16DI/DO for 120 V AC	**6ES7 133-1BL00-0XB0**
• 16DI	**6ES7 131-1EH00-0XB0**
• 16DO	**6ES7 132-1EH00-0XB0**
• 8DI/8DO	**6ES7 133-1EH00-0XB0**
* 16DO relay output	Available soon
• 8DI/DO relay output	**6ES7 133-1JH00-0XB0**
Electronics block for ET 200L-SC (digital and analog expandability) with digital inputs/outputs	
• 16DI	**6ES7 131-1BL11-0XB0**
• 32DI	**6ES7 131-1BL11-0XB0**
• 16DO	**6ES7 132-1BH11 0XB0**
• 16DI/DO	**6ES7 133-1BL10-0XB0**
IM-SC PROFIBUS-DP connection for TB16IM-SC incl. screw terminal connector for DP connection and power supply	**6ES7 138-1XL00-0XB0**
Terminal block for ET 200L and ET 200L-SC to accommodate electronics blocks or electronic modules.	
TB16IM-SC	
• screw-type terminal	**6ES7 120-0AH50-0AA0**
• spring-loaded terminals	**6ES7 120-0BH50-0AA0**
TB16L	
• 16 channels, screw-type term.	**6ES7 193-1CH00-0XA0**
• 16 channels, spring-loaded terminals	**6ES7 193-1CH10-0XA0**
TB32L	
• 32 channels, screw-type terminal	**6ES7 193-1CL00-0XA0**
• 32 channels, spring-loaded term.	**6ES7 193-1CL10-0XA0**
TB16L AC	
• 16 channels, screw-type terminal	**6ES7 193-1CH20-0XA0**
Terminal block for ET 200L-SC to accommodate 8 SIMATIC SC electronics modules, expandable by 1 SIMATIC SC TB16SC	
Supplementary terminal for ET 200L and ET 200L-SC 16 channels; 1 row	
• screw-type terminals	**6ES7 193-1FH20-0XA0**
• spring-loaded terminals	**6ES7 193-1FH50-0XA0**
16 channels; 2 rows	
• screw-type terminals	**6ES7 193-1FH30-0XA0**
• spring-loaded terminals	**6ES7 193-1FH60-0XA0**
32 channels; 1 row	
• screw-type terminals	**6ES7 193-1FL20-0XA0**
• Spring-loaded terminals	**6ES7 193-1FL50-0XA0**
32 channels 2 rows	
• screw-type terminals	**6ES7 193-1FL30-0XA0**
• spring-loaded terminals	**6ES7 193-1FL60-0XA0**
Labeling sheet for ET 200L-SC with 10 stripes, DIN A4 each for	
• 16 channel electronics blocks incl. supplementary terminals	**6ES7 193-1BH00-0XA0**
• 32 channel electronics blocks incl. supplementary terminals	**6ES7 193-1BL00-0XA0**

Ordering data	Order No.
SIMATIC SC electronic modules for terminal block TB16SC	
• 2DI with 2 inputs (Qty.8)[1]	**6ES7 121-1BB00-0AA0**
• 2DO with 2 outputs 0.5A (Qty 8)[1]	**6ES7 122-1BB00-0AA0**
• 2DO with 2 outputs 2A (Qty. 2)[1]	**6ES7 122-1BB10-0AA0**
• 1DI with 1 input AC 115/230 V[1]	**6ES7 121-1FA00-0AA0**
• 1DO with 1 output AC 115/230 V 1A[1]	**6ES7 122-1FA00-0AA0**
• 1DO with 1 relay out DC/AC 5 A[1]	**6ES7 122-1HA10-0AA0**
• 2AI with 2 inputs ± 10V, 1 to 5 V [1]	**6ES7 123-1FB00-0AB0**
• 1AI with 1 input (PT 100) [1]	**6ES7 123-1JA00-0AB0**
• 2AI with 2 inputs (4 to 20 mA, ± 20 mA)[1]	**6ES7 123-1GB00-0AB0**
• 2AI with 2 inputs (thermo)[1]	**6ES7 123-1JB00-0AB0**
• 1AO with 1 output ± 10V[2]	**6ES7 124-1FA00-0AB0**
• 1AO with 1 output 4 to 20 mA[2]	**6ES7 124-1GA00-0AB0**
• 2AI ± 10V, HS	**6ES7 124-1FB50-0AB0**
• 2AI 4 to 20 mA, HS (2 wire transducer)	**6ES7 123-1GB50-0AB0**
• 2AI 4 to 20 mA, HS (4 wire transducer)	**6ES7 123-1GB60-0AB0**
• 1 24 V DC counter, 40 kHz	Available soon
• 2AI 4 to 20 mA, HA	Available soon
Terminal block for SIMATIC SC to expand an ET 200L-SC to accommodate up to 8 SIMATIC SC electronic modules incl. connecting cable to ET200L-SC	
TB 16 SC	
• 8 SC slots, screw-type terminals	**6ES7 120-0AH01-0AA0**
• 8 SC slots, spring-loaded terminals	**6ES7 120-0BH01-0AA0**
Supplementary terminal for TB16 SC of SIMATIC SC 1 row	
• Screw-type terminals	**6ES7 120-1AH00-0AA0**
• Spring-loaded terminals	**6ES7 120-1BH00-0AA0**
2 rows	
• Screw-type terminals	**6ES7 120-2AH00-0AA0**
• Spring-loaded terminals	**6ES7 120-2BH00-0AA0**
Labeling sheet for electronic modules of the SIMATIC SC, DIN A4; per sheet: 72 single-width strips and 12 double-sidth strips with 0, 1 and 2 LED windows as well as 6 sets of different strips for supplementary terminals.	**6ES7 192-2XX00-0AA0**
Shield terminal elements for SIMATIC SC for cable connection to the shield connection element (8 of each); shield diameter 4 to 6 mm.	**6ES7 192-0AA00-0AA0**
RS 485 bus connector	see IK 10
Manual	
ET 200L distributed I/O station and SIMATIC Smart Connect	
German	**6ES7 130-1AA00-8AA0**
English	**6ES7 130-1AA00-8BA0**
French	**6ES7 130-1AA00-8CA0**
Spanish	**6ES7 130-1AA00-8DA0**
Italian	**6ES7 130-1AA00-8EA0**

[1] Occupies 1-slot in TB16 SC
[2] Occupies 2-slot in TB16 SC



Application

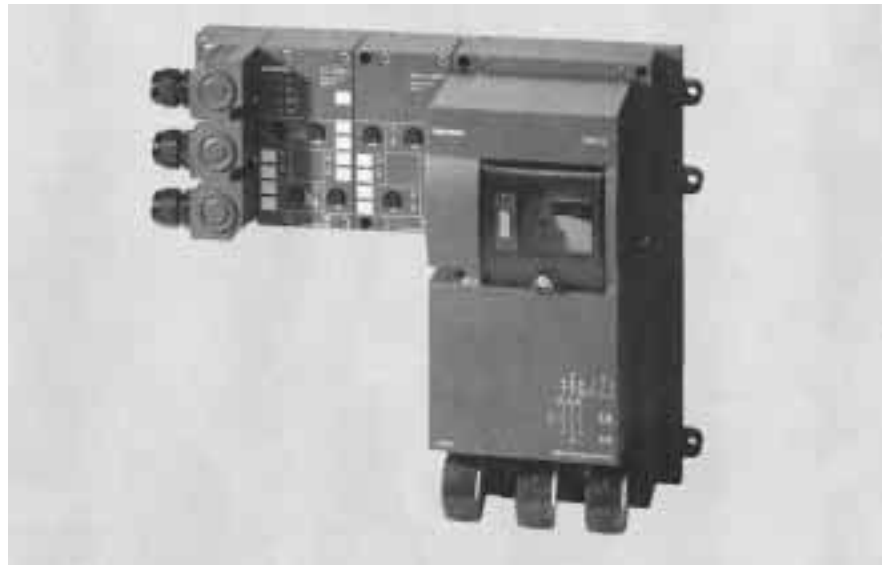


Fig. 4/10 ET 200X compact I/O station

The ET 200X is a distributed I/O drop designed to the IP 67/NEMA 4X degree of protection. Apart from the input/output modules, motor starts for any type of three-phase AC load are also integral to the ET 200X.

Due to the high degree of protection and to its rigidity, ET200X is particularly suitable for use in the machine environment.

The modular design, the high degree of protection and plug-in connections throughout permit rapid and optimum adaptation to the control functions of a machine.

Even in the case of frequently changing requirements, the equipment setup times can be significantly reduced by swapping and combining different basic and expansion modules.

Thanks to a transmission rate of up to 12 Mbit/s on PROFIBUS-DP, the ET 200X is also ideal for implementing extremely time-critical applications.

EMERGENCY-STOP concepts are easily implemented due to the separate auxiliary supply on the modular motor starter.

Design

The ET 200X distributed I/O drop comprises

- One basic module and
- Expansion modules.

Basic module

The ET 200X basic module includes an integrated PROFIBUS-DP connection, input or output points and all power requirements.

PROFIBUS and power are wired to a waterproof screw-terminal connector making field termination easy.

Basic modules are available in two different versions:

- Basic module with integral 8DI, 24 V DC
- Basic module with integral 4DO, 24 V DC/2A.

Expansion module

On the right hand side of the basic module, up to 7 expansion modules can be connected via integrated plug-in connections, 6 of which can be load feeder modules for any AC loads. On installation, all signal leads and auxiliary voltages for the inputs and outputs are looped through the integrated backplane of each module. The inputs and outputs themselves are connected to the actuators and sensors via standard 5-pin M12 connectors. In the case of 8-channel digital inputs, two inputs are assigned to the M12 connectors.

The following expansion modules are available:

- Digital modules to a granularity of 4 or 8
  Range:
  Expansion module 8 DI, 24 V DC
  Expansion module 4 DI, 24 V DC
  Expansion module 4 DO, 2A, 24 V DC
- Expansion module with load feeders:
  Direct starter or reversing starter up to 400 V AC 9600 VAC to UL and CSA), up to 5.5 kW, incl. protection functions (“circuit breaker”).

Design (continued)

- Analog modules to a granularity of 2, range:
  - Expansion module 2 AI ± 10V
  - Expansion module 2AI, ± 20 mA, 4 DMU
  - Expansion module 2AI, 4 to 20 mA, 2 DMU
  - Expansion module 2 AI (RTD), PT 100
  - Expansion module 2 AO, ± 10 V
  - Expansion module 2 AO, ± 20 mA, 4 to 20 mA

Connection to PROFIBUS-DP

An ET 200X drop only occupies one PROFIBUS address on the bus.

A separate I/O address can be assigned to each module. ET 200X is completely standardized in accordance with EN 50170 for PROFIBUS-DP and can therefore be used on all standardized masters.

Thanks to the fax transmission rate of up to 12 Mbit/s even the fastest machine functions can be implemented.

Principle of operation

The user program that is executing in the programmable controller can access the inputs and outputs of the ET 200X I/O drop in the same manner as the inputs and ouputs of the central controller.

Communication across PROFIBUS is performed by the master interface in the central controller and the integral PROFIBUS-DP interface in the ET 200X drop.

Parameterization

When an ET 200X is connnected to master modules not parameterized with COM PROFIBUS or STEP 7 (third-party master modules), a *.GSD file can be created using COM PROFIBUS Version 3.1 that will handle ET 200X expansion modules.

This *.GSD file can then be loaded into a configuration tool of a third-party manufacturer and be used for simple parameterization of the station.

This allows use of COM-PROFIBUS's user-friendly plaintext parameterization. There is no need for hexadecimal code inputs in the manufacturer's configuring tool.

4

Technical specifications

Plug-in electronic modules		• Digital inputs/outputs • Analog inputs/outputs • Load feeders
Connection method		M12 circular connector with standard pin assignments for sensors/actuators
Transmission rate		max. 12 Mbit/s
Galvanic isolation		Yes, between PROFIBUS-DP and internal electronics and between outputs and internal electronics.
Supply voltage		24 V DC
Supply current (internal electronics and sensor supply) for overall configuration		
• up to 40˚C	max.	6 A
• up to 55˚C	max.	4 A*
Load current for ET200X		
• up to 40˚C	max.	10 A
• up to 55˚C	max.	8 A
For overall configuration with further looping (several ET 200Xs)		
• up to 40˚C	max.	16 A
• up to 55˚C	max.	12 A
Supply voltage for loads for overall configuration (several load feeders)		
• with core cross-section of 1.5 mm	max.	12 A
• with core cross-section of 2.5 mm	max.	20A

Degree of protection	IP 65/NEMA 4X for ET 200X with load/feeders IP 66/IP 67/NEMA 4X for purely digital modules
Material	Thermoplastic (fiber-glass reinforced)
Ambient conditions	
Temperature	From 0 to 55˚C/131˚F
Temperature change	From 15 to 95%
Relative humidity	Class 2 in acc. with IEC 1131-2
Atmospheric Pressure	From 795 to 1080 hPa
Mechanical loading	
• Vibration	Vibration tested in acc. with IEC 68 Part 2-6 (sine) 10 Hz ≤ f ≤ 58 Hz (const. amplitude 0.075 mm) 58 Hz≤ f ≤ 150 Hz (const. acceleration 5 g, tested with 10 g) (load feeders const. acceleration 2 g)
• Shock	Shock tested in acc. with IEC 68, Parts 2 to 27, half-sine, 15 g 11 ms
Approvals	UL, CSA, FM

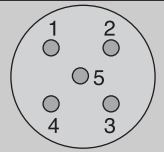
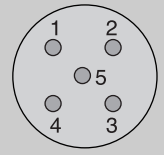
ET 200X (continued)

Technical specifications, basic modules

BM 141 basic module	DI 8 x 24 V DC	BM 141 basic module	DI 8 x 24 V DC
Dimensions W x H x D (in mm/in)		Current consumption from 1L+	180 mA
• Single unit	134 x 110 x 55/5.22 x 4.29 x 2.14	supply voltage max.	
• Pitch unit	107 x 110 x 55/4.17 x 4.29 x 2.14	Module power losses typ.	3.5 W
Transmission rates	Up to 12 Mbit/s	Input voltage	
Number of inputs	8	• Rated value	24 V DC
Cable length, unshielded max.	30 m	• For signal "1"	13 to 30 V
Number of exp. modules that		• For signal "0"	-3 to 5 V
can be connected max.	7	Input delay	1.2 to 4.8 ms
Number of load feeders that		Input characteristic	in acc. with IEC 1131, Type 2
can be connected max.	4	Connection of 2-wire BEROs	possible
Rated supply voltage for the	24 V DC	Permissible no-load current max.	1.5 mA
electronics 1L+			
• Polarity reversal protection	No		
• Short circuit protection	Yes, electronic		
Rated Load voltage 2L+	24 V DC		
• Polarity reversal protection	No		

Technical specifications, basic modules

BM 142 basic module	DO 4 x 24 V DC/2A	BM 142 basic module	DO 4 x 24 V DC/2A
Dimensions W x H x D (in mm/in)		Total current for outputs (per group)	
• Single Unit	134 x 110 x 55/5.22 x 4.29 x 2.14	• up to 20˚C/68˚F max.	6 A
• Pitch unit	107 x 110 x 55/4.17 x 4.29 x 2.14	• up to 55˚C/131˚F max.	4 A
Transmission rates	Up to 12 Mbit/s	Current consumption from 1L+ max.	180 mA
Number of inputs	4	supply voltage	
Cable length, unshielded max.	30 m	Current consumption from 1L+ max.	12 mA
Number of exp.modules that		load voltage	
can be connected max.	7	Module power losses typ	4 W
Number of load feeders that		Short circuit protection for outputs	Yes, electronic
can be connected max.	4	Output current	
Rated supply voltage for the	24 V DC	• At signal "1"	2 A at 24 V DC
electronics 1L+		• At signal "0"	max. 0.5 mA
• Polarity reversal protection	Yes	Switching frequency	
• Short circuit protection	Yes, electronic	• For resistive load max.	100 Hz
Rated Load voltage 2L+	24 V DC	• For inductive load max.	0.5 Hz
• Polarity reversal protection	No	• For lamp load max.	1 Hz

Pin conn	Assignments, female connector X1	Assignments female Connector X2	Assignments, female Connector X3	Assignments, female Connector X4	View of the fem. with pin nos.
~~BM 141 basic module, 8 DI x 24 V DC/2A~~					
1	Supply voltage L+				
2	Input signal, channel 4	Input signal, channel 5	Input signal, channel 6	Input signal, channel 7	
3	Power supply ground				
4	Input signal, channel 0	Input signal, channel 1	Input signal, channel 2	Input signal channel 3	
5	PE				
~~BM 141 basic module, 4 DO x 24 V DC/2A~~					
1	—				
2	Output signal, channel 1 [1]	—	Output signal, channel 3 [1]		
3	Load power supply ground				
4	Output signal, channel 0	Output signal, channel 1 [1]	Output signal, channel 2	Output signal channel 3 [1]	
5	PE				

1) Please note: Channel 1 and channel 3 must only be used on an X1 or X2 female connector or an X3 or X4 female connector.

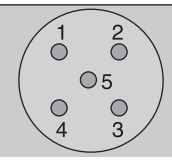
ET 200X (continued)

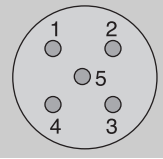
Technical specifications, expansion mod-

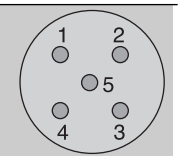
EM 141 expansion module		**DI 8 x 24 V DC**	**DI 8 x 24 V DC**
Dimensions W x H x D (in mm/in)			
• Single Unit		87 x 110 x 55/3.3 x 4.29 x 2.14	87 x 110 x 55/3.3 x 4.29 x 2.14
• Pitch unit		60 x 110 x 55/2.34 x 4.29 x 2.14	60 x 110 x 55/2.34 x 4.29 x 2.14
Number of inputs		8	4
Cable length, unshielded	max.	30 m	max. 30 m
Module Power Losses	typ.	1.5 W	typ. 1.5 W
Current consumption from backplane bus (1L+)	max.	16 mA	max. 16 mA
Input voltage			
• Rated		24 V DC	24 V DC
• for signal "1"		13 to 30 V	13 to 30 V
• for signal "0"		-3 to 5 V	-3 to 5 V
Input delay		1.2 to 4.8 ms	1.2 to 4.8 ms
Input characteristic		In acc. with IEC 1131, Type 2	In acc. with IEC 1131, Type 2
Connection of 2 wire BEROs		Possible	Possible
• Permissible no-load current	max.	1.5 mA	max. 1.5 mA

EM 142 expansion module		**DO 4 x 24 V DC/2A**	**DO 4 x 24 V DC/0.5A**
Dimensions W x H x D (in mm/in)			
• Single Unit		87 x 110 x 55/3.3 x 4.29 x 2.14	87 x 110 x 55/3.3 x 4.29 x 2.14
• Pitch unit		60 x 110 x 55/2.34 x 4.29 x 2.14	60 x 110 x 55/2.34 x 4.29 x 2.14
Number of outputs		4	4
Cable length, unshielded	max.	30 m	30 m
Total current for outputs (per group)			
• up to 20° C	max.	6 A	2 A
• up to 55° C	max.	4 A	2 A
Module Power Losses	typ.	2.1 W	2.1 W
Current consumption from backplane bus (1L+)	max.	28.5 mA	28.5 mA
Current consumption from backplane bus (2L+) (without load)	max.	12 mA	6 mA
Short circuit protection for ouputs		Yes, electronic	Yes, electronic
Output current			
• at signal "1"		2 A at 24 V DC	0.5 A at 24 V DC
• at signal "0"		0.5 mA	0.1 mA
Switching frequency			
• for resistive load	max.	100 Hz	100 Hz
• for inductive load	max.	0.5 Hz	0.5 Hz
• for lamp load	max.	1 Hz	1 Hz

Pin conn	**Assignments, female connector X1**	**Assignments female Connector X2**	**Assignments, female Connector X3**	**Assignments, female Connector X4**	**View of the fem. with pin nos.**
BM 141 expansion module DI 8 x 24 V DC/2A					
1	L+				
2	Input signal, channel 4	Input signal, channel 5	Input signal, channel 6	Input signal, channel 7	
3	Power supply ground				
4	Input signal, channel 0	Input signal, channel 1	Input signal, channel 2	Input signal channel 3	
5	PE				
BM 141 expansion module DI 4 x 24 V DC/2A					
1	L+				
2	Input signal, channel 4	—	Input signal, channel 3[1]	—	
3	Power supply ground				
4	Input signal, channel 0	Input signal, channel 1[1]	Input signal, channel 2	Input signal channel 3[1]	
5	PE				
BM 141 expansion module, DO 4 x 24 V DC/2A and EM 142 DO 4 x 24 V DC/0.5A					
1	—				
2	Output signal, channel 1 [1]	—	Output signal, channel 3 [1]		
3	Load power supply ground				
4	Output signal, channel 0	Output signal, channel 1 [1]	Output signal, channel 2	Output signal channel 3 [1]	







1) Please note: Channel 1 and channel 3 must only be used on an X1 or X2 female connector or an X3 or X4 female connector.

ET 200X (continued)

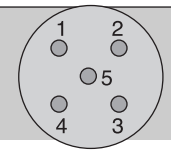
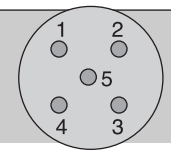
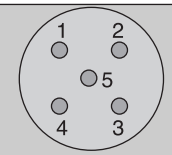
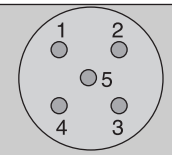
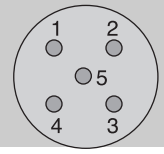
Technical specifications expansion modules (analog inputs, general)

EM 144 expansion module		**EM 144 expansion module**	
Analog value representation (configurable)	S7 format S5 format	Galvanic isolation	No
		Measuring and conversion principle	integrating
Dimensions W x H x D (in mm/in)		Conversion time per channel (Parameterizable)	20 ms. 16.67 ms
• Single unit	87 x 110 x 55/3.39 x 4.2 x 2.14	Resolution (incl. overrange)	112 bits + sign
• Pitch unit	60 x 110 x 55/2.34 x 4.2 x 2.14	Overrange	17.5%
Connection of inputs/ouputs	4/5-pin M12 circular connectors	Operating error limit (over entire temperature range, referred to input range).	± 1.2%
Weight	approx. 250 g		
Interrupts	None		
Number of differential inputs	2		
Cable length, shielded	30 m		

Technical specifications expansion modules (analog inputs)

Analog input	**AI 2 x ± 10 V**
Input range	± 10 V
Input resistance	100 kΩ
Permissable input voltage (destruction limit)	30 V
Connection of signal sensors for voltage measurement	possible
Analog input	**AI 2 x ± 20 mA, 4 DMU**
Input range	± 20 mA, 4.20 mA
Input resistance	25 Ω
Permissable input voltage (destruction limit)	40 mA
Connection of signal sensors for current measurement	
• as 2 wire transducers	not possible
• as 4 wire transducers	possible
Analog input	**AI 2 x 4 to 20 mA**
Input range	4 to 20 mA
Input resistance	25 Ω
Permissable input voltage (destruction limit)	40 mA
Short-circuit protection	yes
Short-circuit current	approx. 45 mA
Load impedence of signal sensor	
Connection of signal sensors for current measurement	max. 750 kΩ
• as 2 wire transducers	possible
• as 4 wire transducers	possible
Analog input	**AI 2 x RTD (PT100)**
Input range	PT 100 (standard)
Input resistance	10 MΩ
Linearization of characteristic	Yes
Permissibile input voltage (destruction limit)	30 V
Measured current	1.5 mA
Connection of signal sensors for voltage measurement	
• as 2 Wire Connection	possible
• as 3 Wire Connection	possible
• as 4 Wire connection	possible

ETE 200 X (continued)

Pin	Assignments, fem. connector X1	Assignments, fem. connector X2	View of the fem. conn with pin nos.
Analog input AI 2 x ±10 V			
1	Sensor supply L+		
2	Input signal "+" channel 0	Input signal "+" channel 1	
3	Power supply ground		
4	Input signal "-" channel 0	Input signal "-" channel 1	
5	PE		
Analog input AI 2 x ±20 mA, 4 DMU			
1	Sensor supply L+		
2	Input signal "+" channel 0	Input signal "+" channel 1	
3	Power supply ground		
4	Input signal "-" channel 0	Input signal "-" channel 1	
5	PE		
Analog input AI 2 x 4..20 mA, 2 DMU			
1	Sensor supply L+ [1)] Input signal "+" channel 0	Sensor supply L+ [1)] Input signal "+" channel 1	
2	Input signal "-" channel 0	Input signal "-" channel 1	
3	Power supply ground		
4	—		
5	PE		
Analog input AI 2 x 4..20 mA, 4 DMU			
1	—		
2	Input signal "+" channel 0	Input signal "+" channel 1	
3	Power supply ground/ Input signal "-" channel 0	Power supply ground/ Input signal "-" channel 1	
4	—		
5	PE		
Analog input AI 2 x RTD (PT100)			
1	Sensor supply output current (approx. 1 mA)		
2	Input signal "+" channel 0	Input signal "+" channel 1	
3	Power supply ground		
4	Input signal "-" channel 0	Input signal "-" channel 1	
5	PE		

1) The power supply for the sensor must be delivered from external

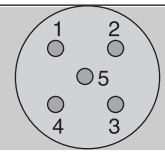
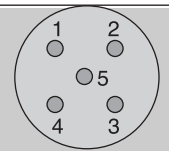
Technical specifications expansion modules (analog outputs, general)

EM 144 expansion module		EM 144 expansion module	
Analog value representation (configurable)	S7 format S5 format	Galvanic isolation	No
Resolution (incl. overrange)			11 bits + sign
Dimensions W x H x D (in mm/in)		Conversion time of the analog signal path	max. 1 ms
• Single unit	87 x 110 x 55/3.39 x 4.29 x 2.14	Setting time	
• Pitch unit	60 x 110 x 55/2.34 x 4.29 x 2.14	• for resistive load	0.6 ms
Connection of inputs/ouputs	4/5-pin M12 circular connectors	• for capacitative load	6.0 ms
Weight	approx. 250 g	Operating error limit (over entire temperature range referred to input range)	± 1%
Interrupts	None		
Number of differential inputs	2		
Cable length, shielded	30 m		

ET 200X (continued)

Technical specifications expansion modules (analog outputs)

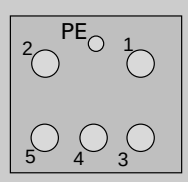
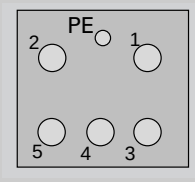
Analog output		**AO 2 x ± 10 V**
Output ranges (rated values)		-10 to 10 V
Load impedence,	min.	1.0 kΩ
capacitative load	max.	0.1 µF
Short-circuit protection		yes
Short-circuit current	max.	30 mA
Permissible input voltage (destruction limit)		30 V
Connection of actors		
2 wire connection		possible
4 wire connection (measuring cable)		possible
Analog output		**AO 2 x + 20 mA, 4 to 20 mA**
Output ranges (rated values)		-20 to 20 mA
parameterizable		4 to 20 mA
Load impedence,	max.	500Ω
inductive load	max.	0.1 mH
Current output no-load voltage	max.	1.5 V
Permissible input current (destruction limit)		
Connection of actors		
2 wire connection		possible

Pin	**Assignments, fem. connector X1**	**Assignments, fem. connector X2**	**View of the fem. conn. with pin nos.**
Analog output AO 2 x ± 10 V			
1	Output signal Qv, channel 0	Output signal Qv, channel 1	
2	Sensor cable S+ Channel 0	Sensor cable S+, channel 1	
3	Power supply ground		
4	Sensor cable S, channel 0	Sensor cable S, channel 1	
5	PE		
Analog output AO 2 x ± 20 mA, 4..20 mA			
1	Output signal Q1, channel 0	Output signal Q1, channel 1	
2	—		
3	Power supply ground		
4	—		
5	PE		

ET 200X (continued)

Technical specifications, EM 300 DS and EM 300 RS expansion modules

Application	• Suitable for switching and protecting any AC loads, mostly standard motors, up to 5.5 kW at 400 V AC (AC 600 V in acc. with UL and CSA) • Used as direct starter (EM 300 DS) or as reversing starter (EM 300 RS) with adjustment ranges of 0.06 kW (0.14 - 0.2A) to 5.5 kW (9-12A)
Design	• 3 power connections for supply and transmission of the load voltage as well as for connecting the load itself. • Connection provided for a handheld unit (for manual mode) • Sealable transparent cover over the circuit breaker
Installed dimensions W x H x D (in mm/in)	
• Single unit	146 x 265 x 135/5.69 x 10.33 x 5.26
• Module width	120 x 265 x 135/4.68 x 10.33 x 5.26
Weight (kg)	
• Direct starter (EM 300 DS)	1.5
• Reversing starter (EM 300 RS)	1.7
Rated supply voltage for the electronics 1L+	24 V DC
Rated load voltage 2L+	24 V DC
Total current for load feeders	
• for connection of 1.5 mm^2	12 A
• for connection of 2.5 mm^2	20 A
Current consumption	
• from backplane bus (supply voltage 1L+)	max. 70 mA
• from load voltage 2L+ (without handheld unit)	max. 170 mA
Main circuit:	
• Rated operating voltage U_e in accordance with DIN VDE 0106, Part 1014 in accordance with CSA and UL	400 V AC 600 V AC
• Rated power	5.5 kW
Assignment type	Type 1 ($I_n \leq 12$ A) Type 2 ($I_n < 1.6$A)
Circuit breaker	**3RV10**
Tripping class	Class 10
Max. rated current	12A
Adjustment ranges:	
• Thermal overload release	0.14 - 0.2A to 9 - 12 A
• Instantaneous electromagnetic overcurrent release	Permanently set to 12 x I_n
Starter combination, short-circuit proof	50 kA (in acc. with classification type 1, I_n = 12 A)
Mechanical endurance	100000 operating cycles
Contactor	
• Direct starter	3RT101
• Reversing starter	2 x 3 RT101 withassembly kit 3RA19 13-2A
Utilization category in acc with VDE 0660, Part 102 and IEC 947-4.1	AC-2, AC-3
Max. output of AC motors	5.5 kW
Rated optional current I_e	12 A
Mechanical endurance	10 million operating cycles.

Pin	Power connector pin assignment	Power connector view front elevation	Pin	Power socket pin assignment	Power socket view front elevation
1/2	—		1/2	—	
3	Phase 3		3	Phase 1	
4	Phase 2		4	Phase 2	
5	Phase 1		5	Phase 3	

ET 200X (continued)

Ordering data	Order No.
Basic modules	
BM 141 basic module	**6ES7 141-1BF01-0XB0**
DI 8 x 24 V DC	
BM 142 basic module	**6ES7 142-1BD11-0XB0**
DO 4 x 24 V DC/2A	
Digital expansion modules	
EM 141 expansion module	**6ES7 141-1BF30-0XA0**
DI 8 x 24 V DC	
EM 141 expansion module	**6ES7 141-1BD30-0XA0**
DI 4 x 24 DC	
EM 142 expansion module	**6ES7 142-1BD40-0XA0**
DO 4 x 24 V DC/2 A	
EM 142 expansion module	**6ES7 142-1BD30-0XA0**
DO 4 x 24 V DC/0.5 A	
Analog expansion modules	
EM 144 expansion module	
AI2 x 10V	**6ES7 144-1FB30-0XB0**
AI2 x ±20 mA, 4-Dr.-MU	**6ES7 144-1GB30-0XB0**
AI2 x 4 to 20 mA, 2-Dr.-MU	**6ES7 144-1GB40-0XB0**
AI2 x RTB	**6ES7 144-1JB30-0XB0**
EM145 expansion module	
AO 2 x ± 10 V	**6ES7 145-1FB30-0XB0**
AO 2 x ± 20 mA, 4 to 20 mA	**6ES7 145-1GB30-0XB0**
EM 300 DS expansion module	
Load feeder, direct starter	
• < 0.06 kW, 0.14 to 0.2A	**3RK1 300-0BS00-0AA0**
• 0.06 kW, 0.18 to 0.25 A	**3RK1 300-0CS00-0AA0**
• 0.09 kW, 0.22 to 0.2 A	**3RK1 300-0DS00-0AA0**
• 0.1 kW, 0.28 to 0.4 A	**3RK1 300-0ES00-0AA0**
• 0.12 kW, 0.35 to 0.5A	**3RK1 300-0FS00-0AA0**
• 0.18 kW, 0.45 to 0.63 A	**3RK1 300-0GS00-0AA0**
• 0.21 kW, 0.55 to 0.8 A	**3RK1 300-0HS00-0AA0**
• 0.25 kW, 0.7 to 1.0A	**3RK1 300-0JS00-0AA0**
• 0.37 kW, 0.9 to 1.25A	**3RK1 300-0KS00-0AA0**
• 0.55 kW, 1.1 to 1.6 A	**3RK1 300-1AS00-0AA0**
• 0.75 kW, 1.4 to 2.0 A	**3RK1 300-1BS00-0AA0**
• 0.9 kW, 1.8 to 2.5 A	**3RK1 300-1CS00-0AA0**
• 1.1 kW, 2.2 to 3.2 A	**3RK1 300-1DS00-0AA0**
• 1.5 kW, 2.8 to 4.0 A	**3RK1 300-1ES00-0AA0**
• 1.9 kW, 3.5 to 5.0 A	**3RK1 300-1FS00-0AA0**
• 2.2 kW, 4.5 to 6.3 A	**3RK1 300-1GS00-0AA0**
• 3.0 kW, 5.5 to 8.0 A	**3RK1 300-1HS00-0AA0**
• 4.0.kW, 7.0 to 10 A	**3RK1 300-1JS00-0AA0**
• 5.5 kW, 9.0 to 12 A	**3RK1 300-1KS00-0AA0**
EM300 RS expansion module	
load feeder, reversing starter	
• < 0.06 kW, 0.14 to 0.2A	**3RK1 300-0BS00-1AA0**
• 0.06 kW, 0.18 to 0.25 A	**3RK1 300-0CS00-1AA0**
• 0.09 kW, 0.22 to 0.32 A	**3RK1 300-0DS00-1AA0**
• 0.1 kW, 0.28 to 0.4 A	**3RK1 300-0ES00-1AA0**
• 0.12 kW, 0.35 to 0.5A	**3RK1 300-0FS00-1AA0**
• 0.18 kW, 0.45 to 0.63 A	**3RK1 300-0GS00-1AA0**
• 0.21 kW, 0.55 to 0.8 A	**3RK1 300-0HS00-1AA0**
• 0.25 kW, 0.7 to 1.0A	**3RK1 300-0JS00-1AA0**
• 0.37 kW, 0.9 to 1.25A	**3RK1 300-0KS00-1AA0**
• 0.55 kW, 1.1 to 1.6 A	**3RK1 300-1AS00-1AA0**
• 0.75 kW, 1.4 to 2.0 A	**3RK1 300-1BS00-1AA0**
• 0.9 kW, 1.8 to 2.5 A	**3RK1 300-1CS00-1AA0**
• 1.1 kW, 2.2 to 3.2 A	**3RK1 300-1DS00-1AA0**
• 1.5 kW, 2.8 to 4.0 A	**3RK1 300-1ES00-1AA0**
• 1.9 kW, 3.5 to 5.0 A	**3RK1 300-1FS00-1AA0**
• 2.2 kW, 4.5 to 6.3 A	**3RK1 300-1GS00-1AA0**
• 3.0 kW, 5.5 to 8.0 A	**3RK1 300-1HS00-1AA0**
• 4.0.kW, 7.0 to 10 A	**3RK1 300-1JS00-1AA0**
• 5.5 kW, 9.0 to 12 A	**3RK1 300-1KS00-1AA0**

Ordering data	Order No.
Accessories for ET 200X	
Manual ET 200X distributed I/O device	
German	**6ES7 198-8FA00-8AA0**
English	**6ES7 198-8FA00-8BA0**
French	Available soon
Spanish	Available soon
Italian	Available soon
Terminal connector for PROFIBUS-DP, Control and auxiliary voltage (incl. 2 heavy guage threaded-joint connections and 1 blanking plug)	**6ES7 194-1AA00-0XA0**
Cable	
• 5-Core, unprepared, for bus signals, power supply, oil resistant, conditional resistance to welding, can be used as trailing cable, PUR sheath	**6ES7 194-1LY10-0AA0-Z** Z= specify length in meters
• 5-Core, unprepreparated, for bus signals, power supply, standard, PVC sheath	**6ES7 194-1LY00-0AA0-Z** Z= specify length in meters
Circular connector M 12 for connecting actuators or sensors, 5-pin	**3RX1 667**
Circular connector M 12 for connecting analog signals, 4/5-pin, shielding possible, pre-assembly possible, 713 series	Available from Franz Binder GmbH & Co Postfach 1152 D-74148 Neckarsulm
Angular circular connector M 12 for connecting actuators or sensors, 5-pin	**3RX1 668**
Y circular connector M 12 for dual connection of sensors via single cable	**6ES7 194-1KA00-0XA0**
Prepared Y cable for sensors and actuators	Available from: Lumberg GmbH & Co Postfach 1360 D58569 Schalksmühle Federal Republic of Germany Automation Catalog 3 Franz Binder GmbH & Co Postfach 1152 D-74148 Neckersulm Federal Republic of Germany Plug Connector Catalog Murr Elektronik GmbH Postfach 1165 D-71567 Oppenweiler Federal Republic of Germany Standard Catalog
Sealing caps M12 for covering unused inputs or input sockets	**3RX9 802-0AA0**

ET 200X (continued)

Ordering data (continued)	Order No.	Ordering data (continued)	Order No.
Accessories for EM300		**Spare parts**	
Load supply connector housing for EM 300, angular with heavy guage threaded-joint connectors for power supply and transmission or for load connection: Qty 10	**3RK1 902-0AA0**	**Labeling strips** for labeling the inputs and outputs, and as equipment designation; 20 sheets of 40 labels, 8 x 10 mm	**6ES7 194-1BA00-0XA0**
Male insert for load supply connector 6-pin, for power transmission and load connection: Qty 5	**3RK1 902-0AB00**		
Contact pins for male insert: Qty 15 1.5 mm² 2.5 mm²	 **3RK1 902-0AC00** **3RK1 902-0AD00**		
Female insert for power supply 6-pin for power supply	**3RK1 902-0AE00**		
Contact sockets for female insert Qty 15 1.5 mm² 2.5 mm²	 **3RK1 902-0AF00** **3RK1 902-0AG00**		
Criminping tool for contact pins and contact sockets	**3RK1 902-0AH00**		
Extraction tool for contact pins and contact sockets	**3RK1 902-0AJ00**		
Connecting cable for EM300 for transmitting power through to adjacent feeders (0.11m; 2.5mm²)	**3RK1 902-0AK00**		
Sealing cap for unused load supply connectors	**3RK1 902-0AL00**		
Manual operating unit for EM 300 DS/RS with 0.5 m connecting cable and plug	**3RK1 902-0AM00**		

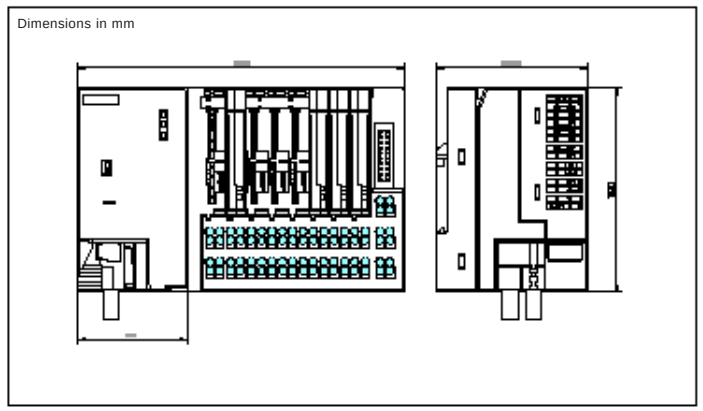
4

The components required for preassembling the load supply connectors are listed in the table below:

For load supply voltage connection	For load connection
1 female insert	1 male insert
3 contact sockets 1.5 mm²/2.5 mm²	3 contact pins, 1.5 mm²/2.5 mm²
1 Flexible 4-core Cu cable, 1.5 mm²/2.5 mm² (3 conductors + PE)	
1 load supply connector housing	
Crimping tool for contact pins/sockets, if required (soldering is possible as an alternative)	

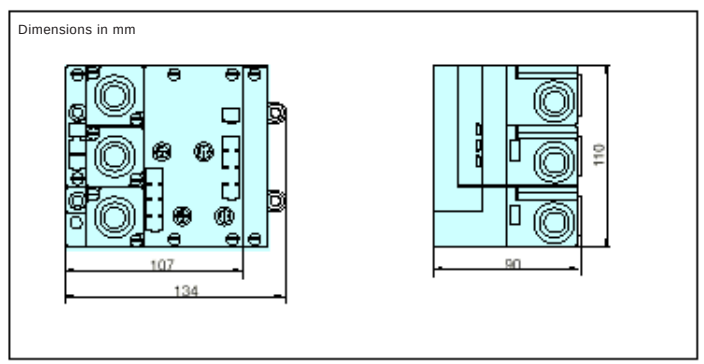
Dimensional diagrams ET 200L, 200X-SC, SIMATIC SC, IM SC

Finely-graded I/O module IM SC with TB 16 IM-SC



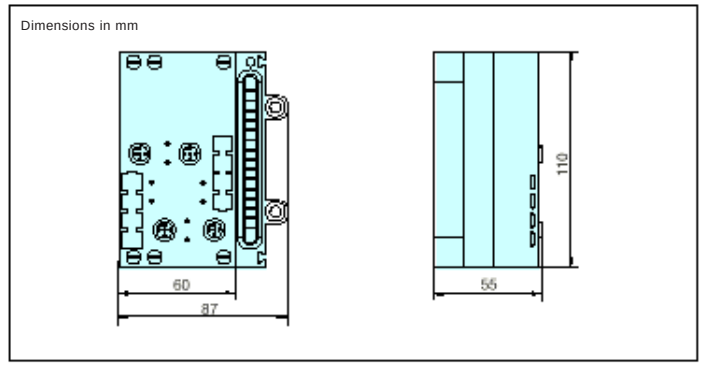
Modular ET 200X I/O station

Basic module



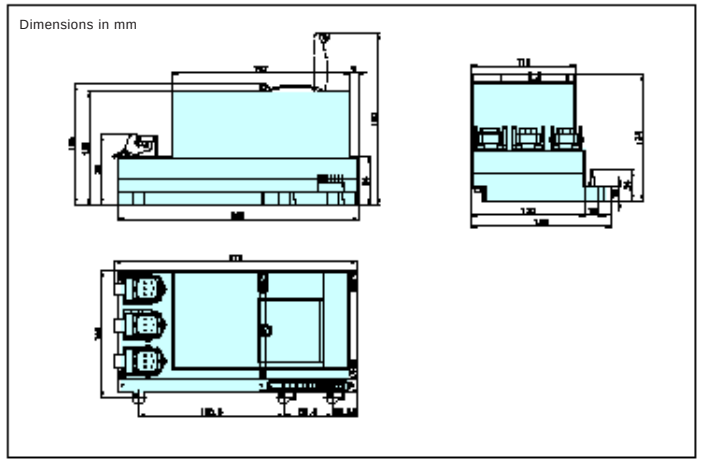
Modular ET 200X I/O station

Expansion module



Modular ET 200X I/O station

EM 300 expansion module



SIMATIC Net DP/AS-Interface Link 20

- Small and efficient gateway between PROFIBUS-DP and AS-Interface.
- No additional power supply required; draws its power from the AS-Interface cable.
- Lets you take AS-Interface segment into operation without running PROFIBUS-DP

NEW!

Fig. 4/10 DP AS-Interface Link 20

System port

for Profibus-DP Master

Design

- Small compact housing features IP 20 degree of protection
- AS interface status display uses LEDs to show operating status on front plate.
- LEDs indicate operation readiness of connected and activated AS-Interface slaves
- PROFIBUS slave address shown
- PROFIBUS-DP bus error and diagnostics information displayed
- One momentary pushbutton lets you toggle operating condition, adopt existing settings and set PROFIBUS slave address.

4

Functions

The DP/AS-Interface link 20 is both PROFIBUS-DP slave (according to EN 50170) and AS Interface master, and connects PROFIBUS-DP without difficulty.

With the DP/AS-Interface Link 20 you can access up to 248 binary elements in the AS-Interface per DP-Master (124 inputs and 124 outputs).

As a result, it combines the advantages of PROFIBUS-DP and AS-Interface in an ideal way, and within one installation.

You can operate the DP/AS-Interface Link 20 in the AS-Interface standard operating mode (M2). In this operating mode, the data bits of the slaves are accessible.

The following master calls are supported:

- Edit address
- Write parameters
- Read configuration data
- Set configuration mode
- Continue current configuration

Configuring

The DP/AS-Interface Link 20 is supported by TISOFT and SoftShop which include COM PROFIBUS (from V 3.2). The manual also provides type files and GSD files. Operation of the AS-Interface does not require any special setup procedures or access to PROFIBUS.

DP/AS-Interface link 20 (continued)

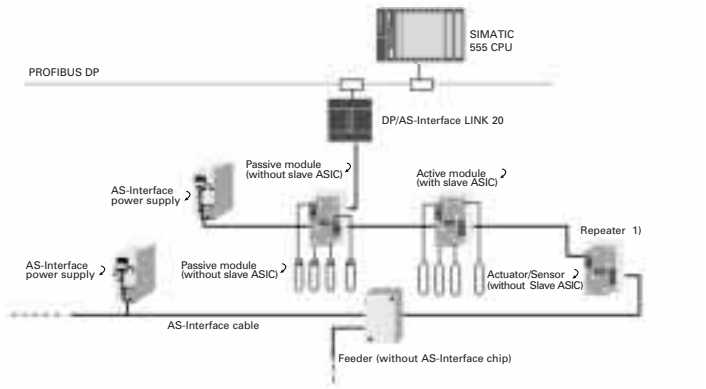


Fig. 4/11 Using DP/AS-Interface Link 20 to interface PROFIBUS DP with AS-Interface.

Technical Specifications

AS-Interface bus cycle time	5 ms for 31 slaves
PROFIBUS transmission rate	max 12 Mbit/s
Supported AS-Interface master profiles	M2
Configure AS-Interface Interfaces	with buttons located on front plate
• AS-Interface connection	7-pole terminal block
• PROFIBUS port	9-pin D-sup socket connector
Supply voltage	
• from AS-Interface cable	matches AS-Interface specification
Current Consumption	
• From AS-Interface cable	max. 200 mA
Current carrying capacity of 5V DC Profibus port	max. 90 ma
Heat Loss	3.7 W
Installation	Snap on DIN rail or screw-mounted
Degree of protection	IP 20
Environment	
• Operating temperature	
- in horizontal position	0°C to +60°C
- in vertical postion	0°C to +45°C
•Transportation and storage temperature	-40°C to +70°C
• Relative humidity	95% at +25°C
Construction	
• Module format	37-200 mounting technology
• Dimentions (W x H x D) in mm	90 x 80 x 60
• Weight	approx. 200 g

Ordering Data

	Order No.
DP/AS-Interface Link 20 network interface PROFIBUS DP/AS-Interface, with type of protection IP 20.	**6GK1 41S-2AA-00**
Manual for the DP/AS-Interface Link 20 Includes Type files and GSD files	
• German	**6GK1 971-2DS00-0AA0**
• English	**6GK1 971-2DS00-0AA1**
• French	**6GK1 971-2DS00-0AA2**
• Italian	**6GK1 971-2DS00-0AA4**

DP/AS-Interface link (IP67)

Application

Fig. 4/12 DP AS-Interface Link (IP67)

The DP/AS-Interface link connects the PROFIBUS-DP to the AS-Interface with degree of protection IP 65.

The DP/AS-Interface link can be connected to the any PROFIBUS DP master capable of transferring 32 bytes of parameterization messages (e.g.IM 308-C, S5-95U/DP master or SIMATIC S7).
With the DP/AS-Interface link, the actuator/sensor interface can be used as a sub-network for PROFIBUS-DP.

In this manner the advantages of PROFIBUS-DP and AS-Interface can be ideally combined into a common bus system.

Design

The DP/AS-Interface link consist of a rugged die-cast aluminum housing with degree of protection IP 66/67.

It conforms to the standard “Enclosures for Electrical Equipment UL 50, Type 4” with respect to water-tigh ness and is suitable for temperatures from 0 ˚C to +60 ˚C.

The diagnostic LEDs for the PROFIBUS-DP and the AS Interface section are located on the housing surface.

The bus station address for the PROFIBUS-DP can be set on DIL switches or using an EEPROM. The ET 200 hand-held unit can be used to set the address via the EEPROM.

The DP/AS-Interface link can be mounted anywhere and in any position.

- Connection to PROFIBUS-DP via 12-pin round connector
- Connection to AS-Interface via 4-pin plug (M12 AS-Interface adapter).

Principle of operation

In order to function as a transceiver between the two bus systems, the DP/AS-Interface link has the functionality of an AS-Interface master towards the AS-Interface and the functionality of a PROFIBUS-DP slave towards the PROFIBUS-DP.

Up to 31 AS-Interface slaves can be connected to the DP/AS-Interface link. Thus, from the perspective of the PROFIBUS-DP, the DP/AS-Interface link is a modular slave with up to 31 modules.

Configuring

Like all other components of the ET 200 distributed I/O system, the DP/AS-Interface link is an integral component of the STEP 7 and COM PROFIBUS parameterization software.

Information to support configuring can be called using context-related help when applying the parameterization software.

DP/AS-Interface link (IP67) (continued)

Technical specifications

Data transfer rate		Permissible ambient conditions	
PROFIBUS-DP	Max. 12 Mbit/s	• Operating temperature	-25 °C to +60 °C
AS-Interface bus cycle time	5 ms with 31 slaves	• Transport/storage temperature	-40 °C to +70 °C
Interfaces		• Relative humidity	95% at +25 °C
• Connection to PROFIBUS	2 X 12-pin connectors, 24 V supply	Constructional design	
• Connection to AS-Interface	1 X 4-pin plug	• Dimensions (W X H X D) in mm	205 X 80 X 57
Supply voltage	24 V DC	• Weight	.800 g
Current consumption			
• DP part (24 V DC)	100 mA		
• AS-Interface part	70 mA		

Ordering data	Order No.	Ordering data	Order No.
DP/AS-Interface link to connect the AS-Interface to PROFIBUS-DP	**6ES7 156-0AA00-0XA0**	**Manual** DP/AS-Interface link	
		• German	**6ES7 156-0AA00-8AA0**
Stabilized AS-Interface power supply SITOP power special line DC/DC supply 24 V/30 V, max. 2.4 A with degree of protection IP 65 to supply power to the AS-Interface	**6EP1 632-1AL01**	• English	**6ES7 156-0AA00-8BA0**
		• French	**6ES7 156-0AA00-8CA0**
		• Spanish	**6ES7 156-0AA00-8DA0**
		• Italian	**6ES7 156-0AA00-8EA0**
AS-Interface female connector to connect the AS-Interface to the DP/AS-Interface link	**6ES7 194-5AA00-0XA0**	**PROFIBUS bus connector** with degree of protection IP 66/67 for bus signals, power supply, 12-pin, with pin insert	**6ES5 760-2CB11**

Software

5

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Application, Design, Ordering Data	5/2
SoftShop	5/3
SIMATIC APT	5/4
Application, Design,	5/4
Ordering Data	5/4

TISOFT

Application

TISOFT is a complete programming, documentation and troubleshooting package for use with all SIMATIC 505 programmable controllers. The package runs on an IBM PC AT/XT or compatible PC, running under MS DOS 6.0, Windows 3.1 only. Not supported on Windows 95 or NT.

Design

TISOFT is designed for easy use without sacrificing the time-saving features that are so vitally important to experienced system programmers. From menu driven screens to extensive on-line help utilities, TISOFT provides the tools that are needed to help you quickly and easily enter and document PLC programs.

Maintenance personnel that make changes on the factory floor will find TISOFT easy to use. Configurable maintenance charts and advanced troubleshooting aids help you monitor and control the machine process after the automation project is complete.

As your control needs expand, you may find the need to use other members of our programmable control family. TISOFT maintains the same appearance and ease-of-use for all of our controllers so retraining is not required.

The software is delivered with extensive documentation, supports H1 Ethernet, PROFIBUS-FMS, TIWAY PLC nodes.

Ordering data

TISOFT is available in both single user and multiple user kits all supplied on 3.5" disks. Version 6.3 is required for controllers using the PROFIBUS DP I/O Channel.

Single user:	
TISOFT Rel. 6.3 Full System with COM ET200	**PPX: PC505-6263**
TISOFT Rel. 6.3 Upgrade Package with COM ET200	**PPX: PC505-UPG63**

Note: TISOFT Rel. 6.3 requires an IBM compatible computer with 80386 or better processor, 2MB RAM memory, total 540K RAM available conventional memory, 10 megs available hard disk space, 3.5" floppy disk drive, RS-232 serial communications port and MSDOS 6.0 or later.

The COM ET200 Configurator software included with TISOFT 6.3 is required in order to configure a controller using the PROFIBUS DP I/O Channel for Remote I/O. This package requires an IBM computer with 80386-33 or better processor, 6 megs RAM memory, 5 megs available hard disk space, 3.5" floppy drive, MSDOS 6.0 or later, MS windows 3.11.

SoftShop™

Application

505 SoftShop™ is a complete Windows 3.1®, NT® or 95® programming, documentation and trouble-shooting package for use with all 520/530/530C/530T/520C/525/535/545/555/560/565/575 Programmable controllers, and PROFIBUS DP IO. Supports programming over Ethernet, PROFIBUS FMS and TIWAY. Similarity to TISOFT makes it easy to learn for existing TISOFT users.

Design

SoftShop gives first-time users the familiar, easy to use Windows environment to get them up to speed fast while giving experienced programmers easy access to a wealth of powerful features that the SIMATIC 505 is famous for. This intuitive package has all the features you have come to expect from a Windows application such as toolbar instruction picks, cut & paste, customized screen displays and customized printing, but it also includes the latest programming innovations like symbolic programming, "intelligent" cut & paste with "rewire," totally configurable program annotation & documentation capability and last, but not least, simultaneous display of multiple configurable data (status) windows.

For our existing TISOFT users, SoftShop will read all TISOFT files to make transition easy.

SoftShop contains extensive, context sensitive on-line help and a complete manual. Requires Windows 3.1 or later & MS DOS 6.0 or later, or Windows 95 or NT. Runs on a 100% compatible PC with a minimum of 386Dx33 processor, 8MB RAM, VGA monitor, 20MB HDD space, parallel port and a mouse recommended, but not required, supports H1 and TCP/IP Ethernet, PROFIBUS-FMS, TIWAY PLC nodes.

Ordering data

SoftShop V2.1 is supplied with ET200 COMM configurator software which is required in order to configure a controller using the PROFIBUS DP I/O channel for remote I/O. The requirement of a hardware key is eliminated in corporate packages.

505 SoftShop Full System on 3.5" disks with H/W key and Manual	**PPX:SS505-6201**
8 User Site License	**PPX:SSSS505-6201**
Add 1 User to Site License	**PPX:SSSS505-6301**
Corporate License (USA)	**PPX:SSSS505-6230**
Additional manual set with COM PROFIBUS for corporate license	**PPX:SSSS505-6231**
Manuals and Accessories:	
SoftShop User Manual with release 2.0 disks	**PPX:SS505-8101-3**
545/555/575 Programming Reference Manual	**PPX:505-8204-2**
ET200 Distributed I/O System Manual	**PPX:505-8206-2**
CABLE, 545/555 TISOFT, 9PF-9PF	**PPX:2601094-8001**

Upgrade License:
The SoftShop package includes a dated H/W key that will support new software releases dated up to 1 year after the purchase date. The new releases may be downloaded free of charge or can be purchased on disks for a nominal handling charge. The H/W key can be field upgraded to add an additional year of upgrade service by ordering:

SoftShop 1 Year ULA* – In Warranty	**PPX:SS505-UPG1**
SoftShop 1 Year ULA* – Out of Date	**PPX:SS505-UPG2**
8 User 1 Year ULA* – In Warranty	**PPX:SSSS505-UPG8**
8 User 1 Year ULA* – Out of Date	**PPX:SSSS505-UPG9**
Add 1 User to Site ULA* – In Warranty	**PPX:SSSS505-UPG1**
Add 1 User to Site ULA* – Out of Date	**PPX:SSSS505-UPG2**
Corporate ULA* – In Warranty	**PPX:SSSS505-UPG30**

Please contact factory for additional individual, multiple user, and corporate license options.
*ULA = Upgrade License Agreement

APT

SIMATIC APT (Application Productivity Tool)

Application

SIMATIC APT (Application Productivity Tool) is an integrated control system design environment that uses Computer Aided Software Engineering (CASE) technology to provide an object-oriented design environment for the SIMATIC 505 programmable controllers. APT also provides a link between the individual controllers and their logical representation in the SIMATIC PCS data base. The package runs on an IBM PC AT or compatible PC.

Design

SIMATIC APT provides a natural means of mapping the physical process into the control system. It encourages the partitioning of the plant processes into a hierarchical structure, which is easier to understand and implement.

APT uses a graphical approach to design. GRAFCET techniques are used for developing sequential logic. APT also has a graphical representation for continuous control processes based on the SAMA[1] standard. Development of lower-level control actions are simplified by using a library of devices and continuous function blocks that include internal interlocks and comprehensive auxiliary information.

Separate safe-state sequential function charts (SFC) provide alternate control action for emergency situations. The safe-state SFCs have flexible return-to-normal paths to match the process operating procedures. Extensive validation functions are included to quickly trap invalid and missing configurations. MAITT, a test language interpreter, is included for writing tests and validating control logic.

The principal features are:

- Supports sequential, continuous, safe-state, parallel, batch control strategies and process partitioning
- Integrates application design development, testing, documentation, and maintenance
- Windowing, split-screens, pull-down help screens, embedded algorithms, and fill-in-the-blank forms
- Sequential function chart (SFC) and continuous function chart (CFC) graphics-based languages
- State control and math text-based languages
- Multiple main and subordinate safe-state SFCs with priority levels
- Libraries of standard control algorithms

See ST-45 SIMATIC PCS Catalog for details on APT.

[1]SAMA = Scientific Apparatus Manufacturers Association

Ordering data

SIMATIC APT-Software License and Manual Set, Rel. 1.7a	**PPX:APT-6201-T**
SIMATIC APT-Software Upgrade, with Manual Set (Rel. 1.7a)	**PPX:APT-6202-T**
SIMATIC APT-Software Rel. 1.7a, with Manual Set, single-user access key, and CP 1413 network card. Compatible with both SIMATIC 505 and SIMATIC S5 controllers over Ethernet network.	**PPX:APT-6204-T**
Manuals System Overview for APT-Software, English User for APT-Software, Programming Reference for APT-Software, Set for APT-Software (Rel. 1.7a)	**PPX:APT-8100** **PPX:APT-8200-T**

SIMATIC Human-Machine Interface Systems WinCC Integrated Human-Machine Interface Software

6

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Introduction

The more complex automated processes become, the greater the need for process-oriented human-machine communication.

The SIMATIC Human-Machine Interface family is a perfected range of user-friendly human-machine interfaces (HMIs) suitable for use with SIMATIC 505 programmable controllers. The range extends from low-end operator panels to complete operator control and process monitoring systems with pixel-graphics capability.

The complete coordination between SIMATIC 505 and SIMATIC products and their full integration in the system substantially simplifies the application of these HMIs.

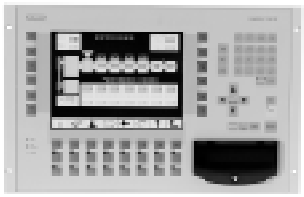
Coordination

The SIMATIC 505 system is already integrated with the SIMATIC human-machine interface. The HMI system requests process data from the SIMATIC 505 programmable controller. Data transfer is controlled by the operating system; no additional user programming overhead is needed.

System integration

Numerous features, ranging from a unified database and symbology to the use of the same user-friendly Windows-oriented interface, simplify the use of HMI systems.

SIMATIC HMI systems can be connected directly to the SIMATIC 505 CPUs. Process control monitoring over large distances can be implemented with the PROFIBUS-DP bus system.



Operator panels (OP)

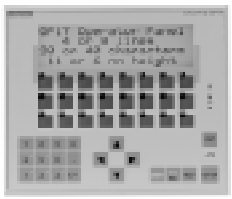
For fast intervention right at the machine, e.g. to deal with faults.

These panels can be used to:

- enter setpoints,
- display machine data, and
- modify machine-specific parameters.

OP7, OP17 operator panels

Application



The OP7 and OP17 operator panels are designed for machine operation and monitoring.

They are easy to operate and user-friendly. Applications include:

- Mechanical engineering applications
- Packaging systems
- Air-conditioning systems.

The OP7 and OP17 can be connected to:

- The SIMATIC S7-200, S7-300/400
- The SIMATIC S5-90U through S5-135U
- The SIMATIC 505 PLC systems.
- Other PLCs.

Design

The OP7 and OP17 operator panels incorporate the following features:

- Degree of protection NEMA4 (front panel)
- Built-in flash EPROM for configuration data (128 Kbytes)
- LED-backlit LCD
- Membrane keyboard with 8 (OP7), 24 (OP17) function keys.

OP7

Eight permanently labeled function keys which can be used as soft keys. Four function keys with LED'S

OP17

24 user-labeled function keys with 16 LEDs.

- Built-in interface ports for communications:

OP7

1 x TTY/RS232C (v.24)
1 x RS485/RS422/MPI/PPI/ PROFIBUS DP;

OP17

2 x TTY/RS232C (v. 24)
1 x MPI/PPI/PROFIBUS DP

In addition to communications, the OP7 and OP17 also support simultaneous connection of a printer.

Function

The following functions are available to the user:

- Display of process variables
- Management and editing of status and fault messages
- Date and time stamp in messages (both OP7 and OP17 have an internal real-time clock)
- Definition of message priorities
- Differentiation between first-up and last-up messages
- Classification of process variables into a maximum of 99 logical groups (displays)
- Infotexts for messages, displays, etc.
- Alphanumeric setpoint entry with system keys
- User-configurable printer listings
- Password protection
- Input limit verification
- User-programmable user menus
- Soft keys
- PLC tasks for triggering
- PLC-controlled actions
- Language selection
- Contrast control
- Printer connection via built-in TTY/RS232C (v. 24) interface.

OP7, OP17 operator panels (continued)

Configuring

The SIMATIC ProTool/Lite software is available for configuring the OP7 and OP17 operator panels. The SIMATIC ProTool/Lite is a subset of SIMATIC ProTool. There are various constraints due to the functionality of the OP7 and OP17.

All of the configuration data are stored in the operator panel memory, thereby off loading the programmable controller. There are no problems using existing configurations implemented with ProTool/Lite.

Please refer to Catalog ST 80.1 for further information.

Ordering data

	Order No.		Order No.
OP7/PP operator panel **OP7/DP operator panel** **OP7/DP-12 operator panel** with mounting accessories, 128 Kbyte Flash EPROM and backup battery, with two built in interface ports (1XTTY/RS232C (V24), 1XRS485/422/MPI/PPI/PROFIBUDP), LED - backlit LCD, 4lines, 20cpi, 8mm / .3 in font size.	**6AV3 607-1JC00-0AX1** **6AV3 607-15JC20-0AX1** **6AV3 607-JC30-0AX1**	**OP7/17 manual** Configured with ProTool/Lite **Communications manual** Description of how operator panels can be connected to programmable controllers. English	**6AV3 991-1AE05-0AB0** **6AV3 991-1BC06-0AB0**
OP17 operator panel with mounting accessories 128 kbyte Flash EPROM and backup battery **OP17/PP operator panel** **OP17/PP operator panel** **OP17/DP-12 operator panel** with three built-in interface ports (2 x TTY/RS232 C (V.24), 1 x MPI/PPI/PROFIBUS DP), adjustable LED-backlit LCD: 4 lines, 20 cpl, 8 mm / 0.31 in font size or 8 lines, 40 cpl, 4.5 mm / 0.18 in font size.	**6AV3 617-1JC00-0AX1** **6AV3 617-1JC20-0AX1** **6AV3 617-1JC30-0AX1**	**Configuring software** **SIMATIC ProTool/Lite 4.0** for configuring the OP7 and OP17; Executable on PC's using Windows 95 & Windows NT and higher; multilingual screen forms (available in German, English, French, Italian and Spanish); single license; on CD with configuring guide in *German English French Italian Spanish **PROFIBUS DP bus cable** PROFIBUS DP bus connector for SIMATIC HMI OP; degree of protection IP 20, axial cable outlet. Please refer to Catalog Siemens ST 80.1 or the SIMATIC HMI Order Guide for further information on connecting cables.	**6AV9 620-1BB07-1A ■ 0-T** **A** **B** **C** **D** **E** See Catalog Siemens ST-70. **6GK1 500-0EA00**

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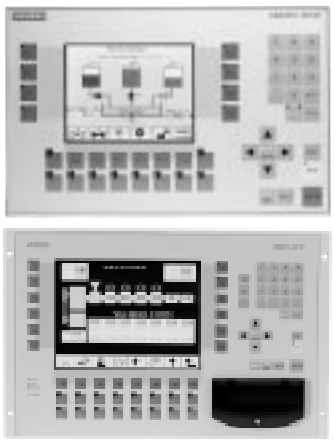
OP27, OP37 operator panels

Application



The OP27 and OP37 operator panels are designed for user-friendly machine operation and monitoring .

They can be used for the following tasks:

- Display of status and fault messages and process variables:

  Process variables are visualized in various formats, such as output fields, bars, trends or status indicators.
- Menu-driven process control and monitoring, e.g. via input.

  Operators can use soft keys, function keys and system keys to enter set-points, control actuators, etc.

Applications include:

- Mechanical engineering
- Packaging systems
- Air-conditioning systems.

The operator panels can be connected to:

- The SIMATIC S7-200, S7300/400
- The SIMATIC S5-90U through S5-135U
- The SIMATIC 505 (PLC 525,535,545,555, 565T)
- PC systems (free serial link)
- Other PLCs.

Design

The OP27 and OP37 operator panels incorporate the following features:

- Rugged die-cast aluminum housing with membrane front panel
- Degree of protection NEMA 4 (front panel)
- Low mounting depth
- Built-in flash EPROM for firmware and user data
- Membrane keyboard: Keys resistant to oil, grease and commercial cleaning agents.
- CCFL-backlit LCD

OP27
Monochrome, or color resolution 320 x 240 pixels

OP37
Color, resolution 640 x 480 pixels

- Built-in interface ports for communications:
  4 interfaces[1]:
  1 x TTY (active/passive.)/ RS232C (v.24),
  1 x TTY (passive/ RS232C (v.24),
  1 X.27/TTY (passive),
  1 x MPI/PPI.

Communications through:

- The built-in programming device (PG) port of the 505 programmable controller.
- The built-in PROFIBUS-DP port on appropriate 505 programmable controllers

Function

The following functions are available to the user:

- Display of process variables
- Management and processing for status and fault messages
- Language selection (three on-line languages)
- Printer connection through built-in interface port
- Printing functions: hard copy, message printout
- Process control using soft keys, function keys or system keys
- Dynamic fields: e.g. input/ output fields, shapes, bars and trends
- Static symbols can be incorporated into process displays (in character or pixel graphics mode)
- Infotexts for messages and variables
- Evaluation of machine status (masking out of dynamic fields, displays, etc. as a function of a given variable)
- Password protection (also for individual functions)
- Recipe management.

The OP37 also has the following features:

- Color LCD (passive), TFT option
- Higher resolution: 640 x 480 pixels
- Extended operator functions provided by extra soft keys and function keys
- Diskette drive.

OP27 and OP37 operator panels (continued)

Configuring

Windows-based SIMATIC Human-Machine Interface ProTool configuring software.

The Windows-based SIMATIC ProTool software is available for configuring the OP7,17,27,37,and TP27,37 operator panels.

The configuration data are entered on a programming device (PG) or PC, stored on hard drive or diskette and then transferred to the RAM of the operator panel.

During configuration, there is no need for a connection between the PG or PC and the operator panel (off-line programming). A cable is used to connect the PG to the operator panel for data transfer.

The SIMATIC ProTool configuring software includes the following features:

- Windows 95 & NT compatibility:The operator control philosophy and the layout of the user interface are Windows-oriented
- Pixel-graphics configuration in off-line mode
- Mouse-supported configuring interface
- Enhanced presentation with drop-down menus
- Fast access to functions using standardized and editor-specific icons
- Object-oriented symbolic programming

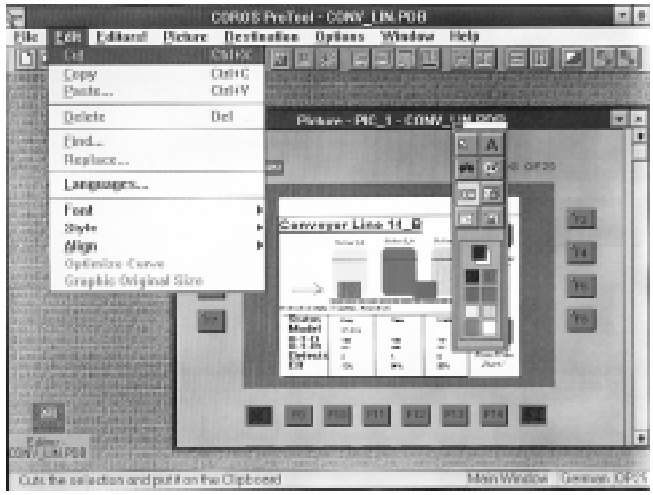


Fig. 6/1 SIMATIC ProTool configuring software. Configuring interface as a classic Windows application.

- Configuring of character-graphics and pixel-graphics symbols
- Importing of pixel-graphics objects
- Verification of all inputs
- Cross-reference lists
- Integrated on-line help system
- Clear documentation of configuration data
- Clearly presented default forms
- Pixel-graphics printout of process displays.

Hardware requirements:

SIMATIC ProTool can be run on PCs (minimum configuration: Pentium processor, 16 Mbtyes on the Windows 95 drive), VGA graphics card, Windows-compatible pointing device (e.g. mouse , lightpen), and Windows 95 & NT, or higher.

Recommended configuration: Pentium processor, 16 Mbyte RAM, hard drive with 40 Mbytes free, graphics card with Windows accelerator chip, mouse.

6

Technical specifications

Operator panel	OP27	OP37
Supply voltage	18 to 30 V DC	
Power consumption (without option)		
• at 24 V DC, typ.	0.4 A	0.8 A
• at 24 V DC, max.	0.6 A	1.0 A
Memory		
• Firmware/user/memory	2 Mbyte flash EPROM (on board)	4 Mbyte flash EPROM (on board)
• RAM	4 Mbytes	8 Mbytes
Clock	Hardware clock	

Operator panel	OP27	OP37
Display	LCD (passive), 320 x 240 pixels	CCFL-backlit 640 x 480 pixels
• Resolution	Monochrome or color	color,TFT or STN
• Active area (W x H) in mm/in	115 x 86/ 4.49 x 3.35	192 x 144/ 7.49 x 5.62
• MTBF background lighting[1]	25,000 h	25,000 h
Keyboard	Membrane keyboard	
• System keys	24	32
• Soft keys	14	20
• Function keys	10	16
• Direct keys (24 V)	8 (optional)	12 (optional)
Diskette drive	No	Optional

[1] For further information, see Order Guide ST 80.

OP27 and OP37 operator panels (continued)

Technical specifications (continued)

Operator panel		OP27	OP37
Interfaces[4]			
• Serial interface SS 1		TTY/20 mA (active/passive); RS 232C (V.24)	
• Serial interface SS 2		TTY/20 mA (passive); RS232C (V.24)	
• Serial interface SS 3		X.27 (RS4221A/485); TTY (passive)	
• Serial interface S7		MPI (S7-300), PPI (S7-200)	
• Keyboard (MFII)		No	No
Message system			
• Status messages	max.	2000[1]	
• Fault messages	max.	2000[1]	
• Length of message text (lines x characters)	max.	2 x 35	1 x 70
• Variables per message	max.	8	
• Infotext per message	max.	7 x 35 characters	
• Status/fault message buffer		Circular buffer able to hold 512 entries	
Process displays			
• Number		Depends on RAM space	
• Character graphics		Yes	
• Symbol sets/ character sets.	max.	4	
• Pixel graphics		Yes, direct access to external editor e.g. input fields, output fields, I/O fields, date/time fields, symbolic I/O fields, bars, curves, shapes, etc.	
• Dynamic objects			

Operator panel		OP27	OP37
Infotext for input fields		7 x 35 characters	
Recipes		255[1]	
• Records per recipe[2]	max.	500[1]	
• Entries per record	max.	500[1]	
On-line languages	max.	3	
Password levels	max.	9	
Configuring tool		SIMATIC ProTool configuring software running under MS Windows, V3.1 or later	
Degree of protection		NEMA 4	
Dimensions in mm/ in			
• Front panel (W x H)		296 x 192/ 11.54 x 7.49	482 x 310/ 18.79 x 12.09
• Panel cut-out (W x H x D)		282 x 178 x 59 / 11 x 6.94 x 2.3 (with direct keypad module and connecting cable D= 79 mm/3.08)	436 x 295 x 85/ 17 x 11.5 x 3.32 (with direct keypad module, diskette drive and cable connecting cable D= 158mm/6.16
Ambient temperature		0 to 50 °C/ 32 to 122 °F	4 to 45 °C/ 40 to 113°F
Non-operating temperature		-20 to -60 °C / 50 to 140 °F	
Relative humidity	max.	85%, no permissible condensation	

Ordering data

	Order No.
OP27 operator panel[3] with 4 built-in interface ports[4] (2 x TTY/RS232C (v.24), 1 x X.27/TTY, 1 x MPI/PPI), mounting accessories, backup battery, 2 Mbyte flash EPROM	
• Basic unit	**6AV3 627-1JK00-0AX0**
OP37 operator panel with 4 built-in interface ports[4] (2 x TTY/RS232C (v.24), 1 x X.27/TTY, 1 x MPI/PPI), mounting accessories, backup battery, 4 Mbyte flash EPROM with passive STN color LCD	
• Basic unit[3]	**6AV3 637-1LL00-0AX0**
• with active TFT color LCD	**6AV3 637-1ML00-0AX0**
OP27/OP37 manual	
• German	**6AV3 991-1AK00-0AA0**
• English	**6AV3 991-1AK00-0AB0**
• French	**6AV3 991-1AD00-0AC0**
• Italian	**6AV3 991-1AD00-0AD0**
• Spanish	**6AV3 991-1AD00-0AE0**

	Order No.
Communications manual Guide for connecting operator panels to programmable controllers; English	**6AV3 991-1BC06-2AB0**
SIMATIC HMI ProTool configuring software for configuring the OP3/5/7/17/27/ 35, TP27/37, and TD17 (with 8 Mbytes RAM) on PCs; multilingual screen forms (German, English, French, Italian or Spanish); on CD ROM single license with configuring guide in	**6AV9 620-1AA07-1A■ 0T**
German	**A**
English	**B**
French	**C**
Italian	**D**
Spanish	**E**
Connecting cables	See Catalog Siemens ST-70.
PROFIBUS-DP bus cable	SeeCatalog Siemens ST-70.
PROFIBUS-DP bus connector for SICOMP PCs and OPs; degree of protection IP 20, axial cable outlet	**6GK1 500-0EA00**

[1]Depends on user memory
[2]Data memory available for records; max. 64 Kbytes.
[3]Subject to the following export regulations; AG: N; AL: –; EC: B; and ECCN: 4D96G.
[4]Not usable simultaneously

Interface Cable Selection Guide

Selection of the OP and the PLC Cable

The OPs require different hardware for different PLCs to communicate to. Use the table below by finding the PLC that you wish to connect the OP to, read across the columns to find the appropriate OP that is being used, and read the cable part number in the box where the two intersect. For example, to find the cable between an OP25 and a SIMATIC 545 (RS 232) PLC, locate the PLC in row 4, locate the OP25 in OP column 6, and read the cable number 6XV1 440-2KH32. If the box is empty, the communication option is not available.

Communications Table for TD17, OP3/5/7/15/17/25/27/37 & TP27/37

For this OP ≥ Communicate to: ∨	OP3	OP5 A1 OP15 C1	OP5 A2 OP15 C2	OP7/PP OP17/ PP	OP7/DP OP17/ DP	TD17 OP7/DP-12 OP17/DP-12 OP25/27/37 TP/2737
Siemens SIMATIC S7-200 PPI Port	6ES7 705-0AA00-7BA0[1]		6ES7 901-0BF00-0AA0[1]		6ES7 901-0BF00-0AA0[1]	6ES7 901-0BF00-0AA0[1]
Siemens SIMATIC S7-300/400 MPI Port	6ES7 705-0AA00-07BA0[1]		6ES7 901-0BF00-0AA0[1]		6ES7 901-0BF00-0AA0[1]	6ES7 901-0BF00-0AA0[1]
Siemens SIMATIC S5 Programming Port		6XV1 440-2AH32		6XV1 440-2AH32		6XV1 440-2AH32
Siemens SIMATIC 545/555 RS232 Port				6XV1 440-2KH32		6XV1 440-2KH32
Siemens SIMATIC 545/555 RS422 Port				6XV1 440-1MH32[3]		6XV1 440-1MH32[3]
Siemens SIMATIC 525/535/565 RS232 Port				6XV1 440-2LH32		6XV1 440-2LH32
Siemens SIMATIC S5/505/S7 L2-DP (1.5MB)			6GK1 500-0EA00[4]		6GK1500-0EA00[4]	6GK1500-0EA00[4]
Siemens SIMATIC S5/505/S7 L2-DP (12MB)						6GK1500-0EA00[4]
Allen-Bradley SLC 5/03-04 DF1 RS232 Port				6XV1 440-2KH32		6XV1 440-2KH32
Allen-Bradley PLC5 DF1 RS232 Port				6XV1 440-2LH32		6XV1 440-2LH32
Allen-Bradley PLC5 DF1 RS422 Port				6XV1 440-2LH32		6XV1 440-2VH32
Mitsubishi FX/FX0 RS232 Port				6XV1 440-2PR32		6XV1 440-2PR32
Mitsubishi FX/FX0 RS422 Port				6XV1 440-2RH32		6XV1 440-2RH32
AEG Modicon MODBUS RS232 Port				6XV1 440-1KH32		6XV1 440-1KH32
Telemecanique TSX17 RS485 Port[2]				6XV1 440-1EH32		6XV1 440-1EH32
Telemecanique TSX 47/67/87/107 RS485 Port				6XV1 440-1EH50		6XV1 440-1EH50

[1]This is a point to point cable with no additional socket. To use standard MPI cable refer to the ST70 catalog. This will allow multiple devices to be connected to the S7-300/400 PLC.

[2]This is for ADJUST or UNI-TELWAY

[3]This is for a 545-1102 CPU. For 545-1101 CPU's use 6XV1 440-2MH32

[4]This is the bus connector only with no additional socket. L2 cable must be ordered separately.

Note: S5 AS511 OP communication is not supported by all S5 CPU's. To communicate to these CPU's use SIMATIC S5 FAP. Affected CPU's are:

- 115U-945
- all 155U processors

Contact Technical Services at 1-800-333-7421 for cabling information for these CPU's.

SIMATIC HMI

Technical specifications

Operator panel	TP27	TP37
Display	STN	TFT
Resolution (pixels)	320 x 240	640 x 480
display dimension	5,7"	10,4"
color	monochrome (8grey levels) or color (8 col.)	color (8 colors)
Keyboard type	Touch (matrix)	Touch (analog/resistive)
Virtuell keyboard for alpha-inputs	yes	yes
LED display	-	4 (Power/HD Busy/Disk/Temp)
Processor	80486 / 33 Mhz	Pentium / 100MHz
Memory		
Flash firmware/configuring (Mbyte)	1	2
D-RAM (Mbyte)	2	8
S-RAM (battery backup, Kbyte)	128	128
Interfaces	IF1/A:TTY (active/passive), RS232-C IF2: TTY (active/passive), RS232-C IF3: - IF1/B: RS-422, RS-485 LPT1:-	IF1/A:TTY (active/passive), RS232-C IF2: TTY (active/passive), RS232-C IF3: RS-422, RS-485, TTY (passive) IF1/B: RS-422, RS-485 LPT1: TTL (parallel)
Port for external keyboard	-	backwards PS2
Port for mouse	-	backwards PS2
Power Supply		
Current typ./max.	0,4 A/0,7 A at 24 V	24 V DC (18...30 V, prot. ag. rev. voltage)
Hardware clock	yes (battery backup)	1,3 A/2,0 A at 24 V
Protection front/back	IP65/IP20	yes (battery backup) IP65/IP20
Dimensions [mm]		
front plate W x H	212 x 156	335 x 275
cut out dim. W x H x D	203 x 147 x 65	ca. 310 x 248 x 123
Enviroment		
temperature		
• operation (vert. mounted)	0 to +50˚C	+4 to +45˚C
• operation (hor. mounted)	0 to +40˚C	not possible
• transportion/storage	-20 to +60˚C	0 to +60˚C
Humidity	≤ 85% non-condensing	≤ 95% non-condensing
Features		
Alarm system	All numbers listed below represent the maximum-number for the individual features. The total number is limited by the size of the User Memory	
event messages	2000	
alarm messages	2000	
messages length (lines x char.)	2 x 35	
number of registers per message	8	
help texts with messages	7 x 35 char.	
message buffer	512 messages in FIFO	
Recipes		
number of recipes	255	
recipe memory (Kbyte)	Maximum 448 flash (plus maximum 384 Kbyte submodule)	
data records per recipe	500	
entries per data record	500	
Screens		
number of screens max.	300	
pixel graphic	importing pixel graphic objects from standard drawing packages during configuration	
symbol graphic	yes	
character fonts	1/3	
dynamic objects	Input, Output, Input-Out-put, Date, Time, Symbolic Input, Symbolic Output, Analog representation such as bargraphs and trends, etc.	
help texts with inputs	7 x 35 char.	
Online languages	3	
Password levels	9	
Configuration software	SIMATIC ProTool, runs under MS Windows 95	

Ordering data

Description	Part Number
TP 27 Touch Panel	
With 3 built-in interface ports	
1x RS232C, 1xTTY, 1x MPI/422/485	
Mono:	**6AV3 627-1NK00-0AX0**
Color:	**6AV3 627-1QK00-0AX0**
TP37 Touch Panel	
With 4 built in interface ports	
2x TTY/RS232C, 1xTTY, 1x MPI/PPI/422/485	
Active TFT Color:	**6AV3 637-1PL00-0AX0**

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Introduction

Introduction

- Windows NT4.0 and Windows 95 look and feel
- IHMI- Integrated Human Machine Interface
- Interfaces for all major PLC manufacturers
- Easy to use editors
- Integrates your applications quickly
- Multi-lingual on-line language switching enables worldwide use
- Worldwide Siemens service and support
- Serial drivers for all SIMATIC PLCs standard

Of course it's open

While the industry searches for standards, Siemens again jumps to the front of the class. WinCC easily integrates into your new or existing system, and is a powerful, basic component for any automation system.

WinCC - A custom solution

Since every automation system is different, WinCC was designed to be flexible to fit your needs. Start with the core program, and link individual applications to the WinCC function modules. Configuration is easy, and you have a solution that works for you.

Flexible and efficient

We know your plant is dynamic, so we've built in expansion modules and scaleable software to make it easy to modify your application.

WinCC provides across-the-board flexibility, regardless if the application is for a single user or complex, multi-user systems.

Simply the best

Siemens offers a native visualization system based on the latest technology, including Windows NT 4.0 and Windows 95. The true 32-bit processing system allows multi-tasking with other applications, responding quickly and efficiently to events and alarms. Plus the data integrity is among the best in the business.

Easy to use

With the integration of the Microsoft Win 95 GUI (Graphical User Interface), WinCC is intuitive and easy to use. Using WinCC and its powerful tools, you can reduce development time. And your new operators will be experts with the system quickly.

Transparent to the automation system

WinCC makes both the process and production transparent. It shows current states and archive variations. The graphics function modules link individual programs and allow you to see messages, measured values, recipes and reports.

Use it everywhere - from machine construction to process automation

Because you need a truly integrated HMI, WinCC was designed to work in process automation, production automation and in machine construction. Its features are unmatched by the competition. So take a few minutes and check out the following pages to get the details on why WinCC is the IHMI you've been looking for.

All in all, this means that WinCC is a universal tool, totally flexible and extremely powerful. And because WinCC takes most of the burden off your shoulders, you can give your full concentration to your other automation tasks!

Application

Of course you expect more from a market leader, and Siemens makes sure you have that edge. We've set up the WinCC hotline to answer your questions about the product, and also provide on-site service.
1-800-333-7421

Technical Specifications

WinCC can execute on AT-compatible computers with a 486 or Pentium processor. The table on the left shows what you need for running WinCC under Windows 95 and Windows NT 4.0.

Hardware Table for WinCC

WinCC for Windows95: Hardware Requirements

	Minimum	Recommended	Remarks
CPU		Pentium	
Main Memory	32 MB	32 MB	
Graphics	SVGA	SVGA (2 MB)	
Hard disc (EIDIE)		500 MB Free Disk Space	
Others	200MB	CD-ROM	Load, Multimedia

WinCC for WindowsNT 4.0: Hardware Requirements

	Minimum	Recommended	Remarks
CPU		Pentium	Multiprocessor Computing (MPC) - for enhancing the performance of WinCC
Main Memory	32 MB	32 MB	Server: 32 MB, depending on the number of data points
Graphics	SVGA	SVGA (2 MB)	
Hard disk (SCSI)	200 MB	500 MB Free Disk Space	Server: 1GB, Archiving
Others		CD-ROM MOD, EOD Streamer	Load, Multimedia Archiving

Client/Server

	Minimum	Recommended	Remarks
Client		Pentium	Windows95 or WindowsNT 4.0 workstation
Server		WindowsNT 4.0	Pentium

Function, Ordering Data (continued)

Function

WinCC has a variety of drivers available for major control platforms. Standard with all WinCC packages are drivers for SIMATIC S5, S7, and 505, as well as DDE.

Item #	Part Number #
Base Software Packages	
Runtime 128 Tags	**6AV6 3811BC040AX0**
Runtime 256 Tags	**6AV6 3811BD040AX0**
Runtime 1024 Tags	**6AV6 3811BE040AX0**
Runtime 64K Tags	**6AV6 3811BF040AX0**
Runtime & Development 128 Tags	**6AV6 3811BM040AX0**
Runtime & Development 256 Tags	**6AV6 3811BN040AX0**
Runtime & Development 1024 Tags	**6AV6 3811BP040AX0**
Runtime & Development 64K Tags	**6AV6 3811BQ040AX0**
Powerpack Tag Upgrades	
Powerpack RT - 128 to 256 Tags	**6AV6 3711BD000BX0**
Powerpack RT - 128 to 1024 Tags	**6AV6 3711BE000BX0**
Powerpack RT - 128 to 64K Tags	**6AV6 3711BF000BX0**
Powerpack RT - 256 to 1024 Tags	**6AV6 3711BG000BX0**
Powerpack RT - 256 to 64K Tags	**6AV6 3711BH000BX0**
Powerpack RT - 1024 to 64K Tags	**6AV6 3711BJ000BX0**
Powerpack RT+D - 128 to 256 Tags	**6AV6 3711BD100BX0**
Powerpack RT+D - 128 to 1024 Tags	**6AV6 3711BE100BX0**
Powerpack RT+D - 128 to 64K Tags	**6AV6 3711BF100BX0**
Powerpack RT+D - 256 to 1024 Tags	**6AV6 3711BG100BX0**
Powerpack RT+D - 256 to 64K Tags	**6AV6 3711BH100BX0**
Powerpack RT+D - 1024 to 64K Tags	**6AV6 3711BJ100BX0**
Drivers	
ALLEN - BRADLEY - DF1	**6AV63711CD040BX0**
ALLEN - BRADLEY - Comb. (sol.)	**6AV63711CD040GX0**
GE - SNP / SNPX	**6AV63711CD040EX0**
Mitsubishi MELSEC FX	**6AV63711CD040RX0**
MODICON - ModBus	**6AV63711CD040DX0**
SIMATIC 505 - Ethernet L4	**6AV63711CD040MX0**
SIMATIC 505 TCP/IP	**WINCCDVR505TCPIP**
SIMATIC PROFIBUS-DP	**6AV63711CD040UX0**
SIMATIC S5 - Ethernet L4	**6AV63711CD040KX0**
SIMATIC S5 - Ethernet TF	**6AV63711CD040LX0**
SIMATIC S5/S7 - PROFIBUS-FMS	**6AV63711CD040CX0**
Options	
WinCC Redundancy	**6AV63711EF040AX0**
WinCC User Archives	**6AV63711CB040AX0**
WinCC Server Option	**6AV63711CA040AX0**
Miscellaneous	
WinCC Manuals	**6AV63921XA040AB0**
WinCC Upgrade Ver 3.1 to 4.0	**WINCCUG40**
WinCC Lunch & Learn 128 RT&C	**WINCCPACK40**
WinCC System Integrator Program	**WINCCSYSINT40**

Ordering Data

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	Page
Ordering Information	
SIMATIC 505	7/2
System Components	7/3

Ordering data	Order No.
Central units	
545	
96 Kbyte memory, PROFIBUS-DP port 1024 digital/1024 analog I/O's	**PPX: 545-1103**
192 Kbyte memory, PROFIBUS-DP 2048 digital /1024 analog I/Os	**PPX: 545-1104**
555	
384 Kbyte memory, PROFIBUS-DP 8192 digital/8192 analog I/Os	**PPX: 555-1103**
1840 Kbyte memory, PROFIBUS-DP 8192 digital/8192 analog I/Os	**PPX: 555-1104**
384 Kbytes memory, PROFIBUS-DP Powermath™, SmarTune™ 8192 digital/8192 analog I/Os	**PPX: 555-1105**
1800 Kbytes memory, PROFIBUS-DP Powermath™, SmarTune™ 8192 digital/8192 analog I/Os	**PPX: 555-1106**
525/535	
2KW cpu board	**PPX: 525-1102**
4KW cpu board	**PPX: 525-1104**
12KW cpu board	**PPX: 535-1212**
Manuals (English)	
525/535/545/555	
Hardware for 525/535	**PPX: 505-8103**
545/555 Rel 3.1 System	**PPX: 545/555-8101-2**
545-1101 System	**PPX: 545-8101-4**
Technical product description for 545	**PPX: 545-8103-3**
Programming reference manual Rel 3.1	**PPX: 505-8104-5**
505 Redundant I/O User Manual	**PPX: 505-8125-2**
545/555/575 system manual Rel. 4.0+	**PPX: 505-8201-1**
545/555/575 program reference manual Rel. 4.0+	**PPX: 505-8204-1**
Power supply units	
525/535/545/555	
85 to 132/ 170 to 264 V AC	**PPX: 505-6660**
85 to 132/ 170 to 264 V AC, redundant	**PPX: 505-6660-A/B**
20 to 30 V DC, redundant	**PPX: 505-6663/-A**
I/O communications	
I/O channel controller (IOCC)	**PPX: 505-6830**
Distributed base controller (DBC)	**PPX: 505-6840**
Remote channel controller (RCC), coaxial w/modems	**PPX: 560-2126-B**
Remote channel controller (RCC), w/485 comm shielded twisted-pair	**PPX: 560-2127-B**
Remote base controller (RBC), RF mode	**PPX: 505-6850-A**
Remote base controller (RBC), RS485 mode	**PPX: 505-6851-A**
RF/RS-485 I/O Channel Converter	**PPX: 505-6860**
Remote Base Controller, PROFIBUS DP	**PPX: 505-6870**
PROFIBUS DP Annex (for 545-1103, 575-2104/2105/2106)	**PPX: 505-CP5434-DP**
I/O modules	
Digital Input modules	
16 inputs, isolated 120vac	**PPX: 505-2580**
8 inputs, floating, 20 to 56 V AC	**PPX: 505-4008-A**
16 inputs, floating, 20 to 56 V AC	**PPX: 505-4016-A**
32 inputs, floating, 20 to 56 V AC	**PPX: 505-4032-A**
8 inputs, floating, 4 to 15 V DC	**PPX: 505-4108**
16 inputs, floating, 4 to 15 V DC	**PPX: 505-4116**
32 inputs, floating, 4 to 15 V DC	**PPX: 505-4132**
8 inputs, floating, 79 to 132 V AC	**PPX: 505-4208-A**
16 inputs, floating, 79 to 132 V AC	**PPX: 505-4216-A**
32 inputs, floating, 79 to 132 V AC	**PPX: 505-4232-A**
8 inputs, floating, 14 to 30 V DC	**PPX: 505-4308**
16 inputs, floating, 14 to 30 V DC	**PPX: 505-4316-A**
32 inputs, floating, 14 to 30 V DC	**PPX: 505-4332**
8 inputs, floating, 164 to 256 V AC	**PPX: 505-4408-A**
16 inputs, floating, 164 to 256 V AC	**PPX: 505-4416-A**
32 inputs, floating, 164 to 256 V AC	**PPX: 505-4432-A**
Digital output modules	
16 outputs, isolated 120vac	**PPX: 505-2590-A**
8 outputs, floating, 4.5 to 34 V DC	**PPX: 505-3508**
16 outputs, floating, 4.5 to 34 V DC	**PPX: 505-3516**
32 outputs, floating, 4.5 to 34 V DC	**PPX: 505-3532**
8 outputs, floating, 4.5 to 34 V DC	**PPX: 505-3708**
16 outputs, floating, 4.5 to 34 V DC	**PPX: 505-3716**
32 outputs, floating, 4.5 to 34 V DC	**PPX: 505-3732**
8 outputs, floating, 4.5 to 34 V DC	**PPX: 505-4508**
16 outputs, floating, 4.5 to 34 V DC	**PPX: 505-4516**
32 outputs, floating, 4.5 to 34 V DC	**PPX: 505-4532**
8 outputs, floating, 20 to 132 V AC	**PPX: 505-4608**
16 outputs, floating, 20 to 132 V AC	**PPX: 505-4616**
32 outputs, floating, 20 to 132 V AC	**PPX: 505-4632**
8 outputs, floating, 4.5 to 34 V DC	**PPX: 505-4708**
16 outputs, floating, 4.5 to 34 V DC	**PPX: 505-4716**
32 outputs, floating, 4.5 to 34 V DC	**PPX: 505-4732**
8 outputs, floating, 85 to 256 V AC	**PPX: 505-4808**
16 outputs, floating, 85 to 256 V AC	**PPX: 505-4816**
32 outputs, floating, 85 to 256 V AC	**PPX: 505-4832**
Relay output modules	
8 outputs, 20 to 265 V AC, 4.5 to 30 V DC	**PPX: 505-4908**
16 outputs, 20 to 265 V AC, 4 5 to 30 V DC	**PPX: 505-4916-A**
16 outputs, 10 to 125 V AC, 0 to 120 V DC	**PPX: 505-5417**
32 outputs, 20 to 265 V AC, 4.5 to 30 V DC	**PPX: 505-4932-A**
High current	**PPX: 505-5518**
Manual Digital I/O modules	**PPX: 505-8105-2**
Analog Input modules	
8 inputs, floating 0 to 5 V, -5 to +5 V	**PPX: 505-6108-A**
Manual, analog module	**PPX: 505-8105-2**
16 analog inputs, differential	**PPX: 505-2555**
Manual, differential analog	**PPX: 505-8130-1**
Analog Output modules	
8 outputs, floating, 24 V DC	**PPX: 505-6208-A**
Manual	**PPX: 505-8105-2**
Advanced Featured Analog Input modules	
16 analog inputs, differential	**PPX: 505-2555**
16 thermocouple inputs	**PPX: 505-2556**
16 RTD inputs	**PPX: 505-2557**
Manual 505-2555	**PPX: 505-8130-1**
Manual 505-2556	**PPX: 505-8133-1**
Manual 505-2557	**PPX: 505-8134-1**

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Ordering data	Order No.
Analog Input/output module	**PPX: 505-7012**
8 inputs, 0 to 10 V, 0 to 50 mV	
4 outputs, 0 to 10 V	
8In/4Out Bipolar	**PPX: 505-7016**
User's manual	**PPX: 505-8110-2**
Mounting racks (bases)	
525/535/545/555	
4 slots, 128 I/O points	**PPX: 505-6504**
8 slots, 256 I/O points	**PPX: 505-6508**
11 slots, 352 I/O points, redundant	**PPX: 505-6511**
16 slots, 512 I/O points	**PPX: 505-6516**
Special modules	
Thermocouple/RTD modules	
8 inputs, -50 to +50 mV, thermocouple	**PPX: 505-7028**
8 inputs, -50 to +50 mV, RTD	**PPX: 505-7038**
Calibration connector, T/C	**PPX: 2587705-8009**
Users manuals, thermocouple	**PPX: 505-8111-3**
Manual for RTD	**PPX: 505-8114**
Word input/out modules	
TTL, CMOS, up to 28 V DC input	**PPX: 505-6308**
TTL, CMOS, DC output	**PPX: 505-6408**
Simulator Modules	
32 inputs, 32 LEDs	**PPX: 505-6010**
32 outputs, 32 LEDs	**PPX: 505-6011**
Isolated Interrupt input module	
16 channel, 8 channel interrupt, 24 V DC	**PPX: 505-4317**
16 channel, 8 channel interrupt, 48 V DC	**PPX: 505-4318**
16 channel, 8 channel interrupt, 125 V DC	**PPX: 505-4319**
Manual, isolated interrupt	**PPX: 505-8123-1**
High speed counter & encoding module	**PPX: 505-7002**
4 inputs, 4 outputs, 50 kHz counting speed, 4 to 28 V DC	
Manual, high speed counter	**PPX: 505-8113-2**
Very high speed counter & encoding module	**PPX: 505-7003**
4 inputs, 4 outputs, 100 kHz counting speed, 4 to 28 V DC	
Manual, very high speed counter	**PPX: 505-8127-1**
Basic module	**PPX: 505-7101**
2 (RS 232 C/423) Interfaces, 28 Kbyte memory, 110 to 19,200 baud rate	
Battery for memory backup	**PPX: 2587678-8010**
EEPROM for basic program	**PPX: 2587681-8028**
Manual, basic module	**PPX: 505-8101-2**
386/ATM module	**PPX: 505-ATM-4120**
comprising CPU 80C386SX, 4 Mbyte RAM, 40 Mbyte hard disk, 8 or 16 MHz operation, MS-DOS 3.3	
Battery for memory backup	**PPX: 2587678-8010**
Users manual	**PPX: 505/ATM-MANL-3**
Turbo Plastic module	**PPX: 505-5100**
5 analog inputs, 0 to +5 / 0 to +10 V DC	
4 analog outputs, -10 to +10 V DC	
4 digital output, 15 to +24 V DC	
Manual	**PPX: 505-8117-2**
Turbo Parison module	**PPX: 505-5103**
4 digital / 5 analog inputs, 4 digital / 5 analog outputs	
Manual	**PPX: 505-8118-1**

	Order No.
Program Port Expander	
4 serial port expander	**PPX: 505-2571**
Manual	**PPX: 505-8131-1**
Programming Tools	
505 TISOFT programming software	**PPX: PC505-6263**
505 TISOFT upgrade rel. 6.1	**PPX: PC505-UPG63**
Manual for 505 TISOFT rel. 6.1	**PPX: TS505-8101-7**
Programming Reference for CPU rel. 3.1	**PPX: 505-8104-5**
Programming Reference for CPU Rel 4.0	**PPX: 505-8204-1**
Comm ET200 Distributed I/O User Manual	**PPX: 505-8206-1**
555-1101, 1102 Rel 3.1 Firmwr Upg for RBE	**PPX: 2587681-8035**
RCC S/W Rel 3.52	**PPX: 2587695-8029**
RCC (ASIC) S/W Rel. 4.52	**PPX: 2587695-8030**
505/500 "-A" RBC Rel 3.0 Upgr	**PPX: 2587695-8034**
505-7201 Upg., Rel 3.2 no Manual	**PPX: 2587695-8038**
545 CPU Rel 2.1.1 Firm Upg Kit	**PPX: 2601099-8005**
545-1102 Rel 3.1 Firmware Upg	**PPX: 2601099-8006**
Rel 3.2 Upgr Kit for 505-5184	**PPX: 2601438-8009**
Accessories	
Cable, 545/555 programming	**PPX: 2601094-8001**
Interface adapters	
to 7MT I/Os	**PPX: 505-7190**
User manual	**PPX: 505-8115-2**
to 6MT I/Os	**PPX: 505-5190**
User manual	**PPX: 505-8116-1**
Field interface module to SIMOREG & SIMOVERT & ET200	**PPX: 505-7202**
User manual Rel 3.3	**PPX: 505-8124-5**
Connectors for I/O modules	
Side access, 1 piece	**PPX: 2587705-8010**
Front access, 1 piece	**PPX: 2587705-8011**
Battery for 525/560/565 CPUs & 545-1101	**PPX: 2587678-8005**
Batt 545-1103, 1104, 555-1103, 1104	**PPX: 2587678-8010**
EPROM	
8 x 32 Kbytes, for 525/535 CPU	**PPX: 2587681-8012**
8 x 32 Kbytes, for 525/535 CPU	**PPX: 2587681-8020**
EEPROM	
8 x 128 Kbytes, for 545 or 555	**PPX: 2587681-8022**
545 or 555 User EE Prom 8x256 Kbytes	**PPX: 2587681-8030**
Fuses	
Kit, 3 A/125 V, 5 pack, for 505-45xx	**PPX: 2587679-8012**
Kit, 3 A/250 V, 5 pack, for 505-48xx	**PPX: 2587679-8013**
Kit, 3 A/250 V, 5 pack, for 505-46xx	**PPX: 2587679-8014**
Kit, 3 A/250 V, 5 pack, for 505-6660	**PPX: 2587679-8015**
505 Fuse holder for power supply	**PPX: 2587704-8001**
Screws, 10 pack, for 505 base	**PPX: 2587705-8001**
Blank bazels single width, 5 pieces, for base	**PPX: 2587705-8003**
Manual for I/O Modules 505	**PPX: 505-8105-2**
Programming manual for 505/500	
English, all CPUs prior to PROFIBUS DP	**PPX: 505-8104-5**
Manual SPF Programming	**PPX: 2592901-0008**
User Manual, 505 Redundant I/O	**PPX: 505-8125-2**

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Ordering data	Order No.		Order No.
575		**Accessories**	
SIMATIC 575 CPU 832 Kbytes memory	**PPX: 575-2104**	9 slot support rail	**PPX: 2589739-8001**
SIMATIC 575 CPU 832 Kbytes w/ DP Slot	**PPX: 575-2105**	1 blank bezel	**PPX: 2589739-8003**
SIMATIC 575 CPU 1.8 Mbytes w/ DP Slot 8192 digital/8192 analog I/O Slot for 505 I/O or PROFIBUS DP annex card	**PPX: 575-2106**	Filler panel 0.2 “	**PPX: 2589739-8004**
		Filler panel 0.4 “	**PPX: 2589739-8005**
		Battery 4 V, 5 AH	**PPX: 2589739-8006**
		I/O connector	**PPX: 2589739-8007**
9 slot base with 1” spacing	**PPX: 575-2124**	Fuse, 8 Amp for 575-6660	**PPX: 2589739-8008**
505 Remote I/O annex card	**PPX: 575-2126**	IC, 68882 coprocessor	**PPX: 2589739-8010**
PROFIBUS DP I/O annex card	**PPX: 505-CP5434-DP**	Daisy chain jumper assembly	**PPX: 2589739-8011**
16 slot base with 0.8” spacing	**PPX: 575-2130**	J2 power connector	**PPX: 2589739-8012**
32 pt input 110 V AC	**PPX: 575-4232**	Fuse kit, 575-6663	**PPX: 2589739-8013**
32 pt input 24 V DC	**PPX: 575-4332**	0.8 “ blank filler panel	**PPX: 2589739-8014**
16 in/16 out 24 V DC	**PPX: 575-4366**	0.6 “ blank filler panel	**PPX: 2589739-8015**
32 pt output 0.5 A, 24 V DC	**PPX: 575-4532**	16 slot mounting rails	**PPX: 2589739-8016**
16 pt output 110 V AC	**PPX: 575-4616**	575-2103/2104 rel 4.0 firmware upgrade	**PPX: 2801703-8007**
32 pt output 2.0 A, 24 V DC	**PPX: 575-4732**		
16 pt output, relay 0.5 A	**PPX: 575-4916**	Fan pack for 16-slot, 0.8“ base	**PPX: 575-2131**
Power supply, 185 watt	**PPX: 575-6660**		
Power supply, 300 watt	**PPX: 575-6663**	**Manuals**	
		User manual, 575 system rel. 3.1	**PPX: 575-8101-5**
		575 interboard communications spec.	**PPX: 575-8103-1**
		575 task codes manual	**PPX: 575-8104-1**
		575 Rel 3.1 Int Comm User Manual	**PPX: 575-8103-2**
		User manual, 545/555/575 Rel. 4.0 system w/PROFIBUS	**PPX: 505-8201-1**

All part numbers for manuals are for English versions. Contact your Siemens Representative for manuals in other langages.

Connectivity Data

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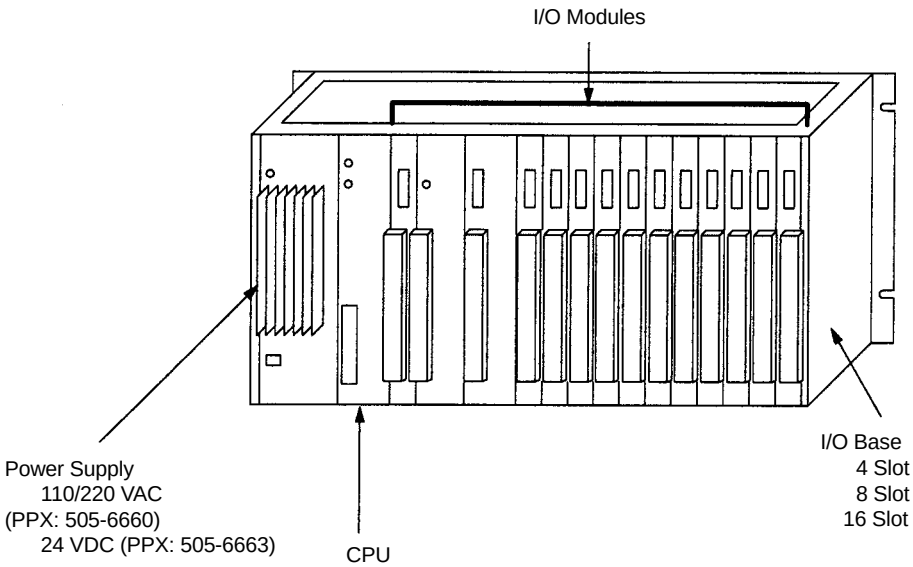
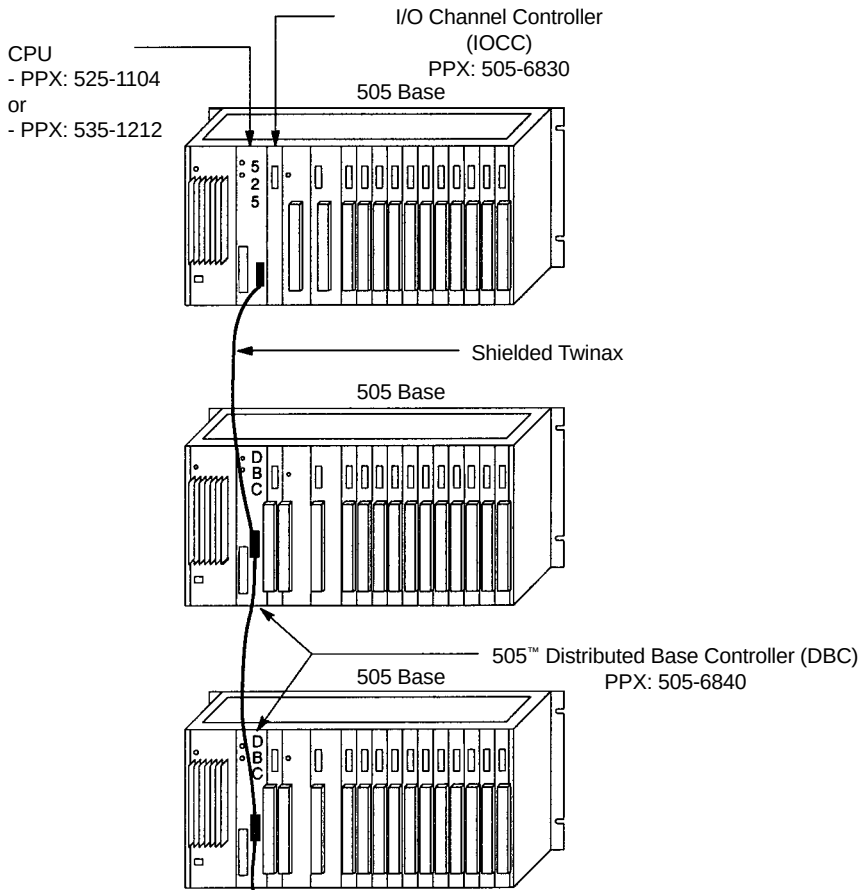
	Page
SIMATIC 505	A/2
SIMATIC 525 and 535 with Distributed I/O	A/3
SIMATIC 545 and 555 with Remote I/O	A/4
SIMATIC 545 and 555 with PROFIBUS-DP I/O	A/5
SIMATIC 505 and 575 System Chassis	A/6

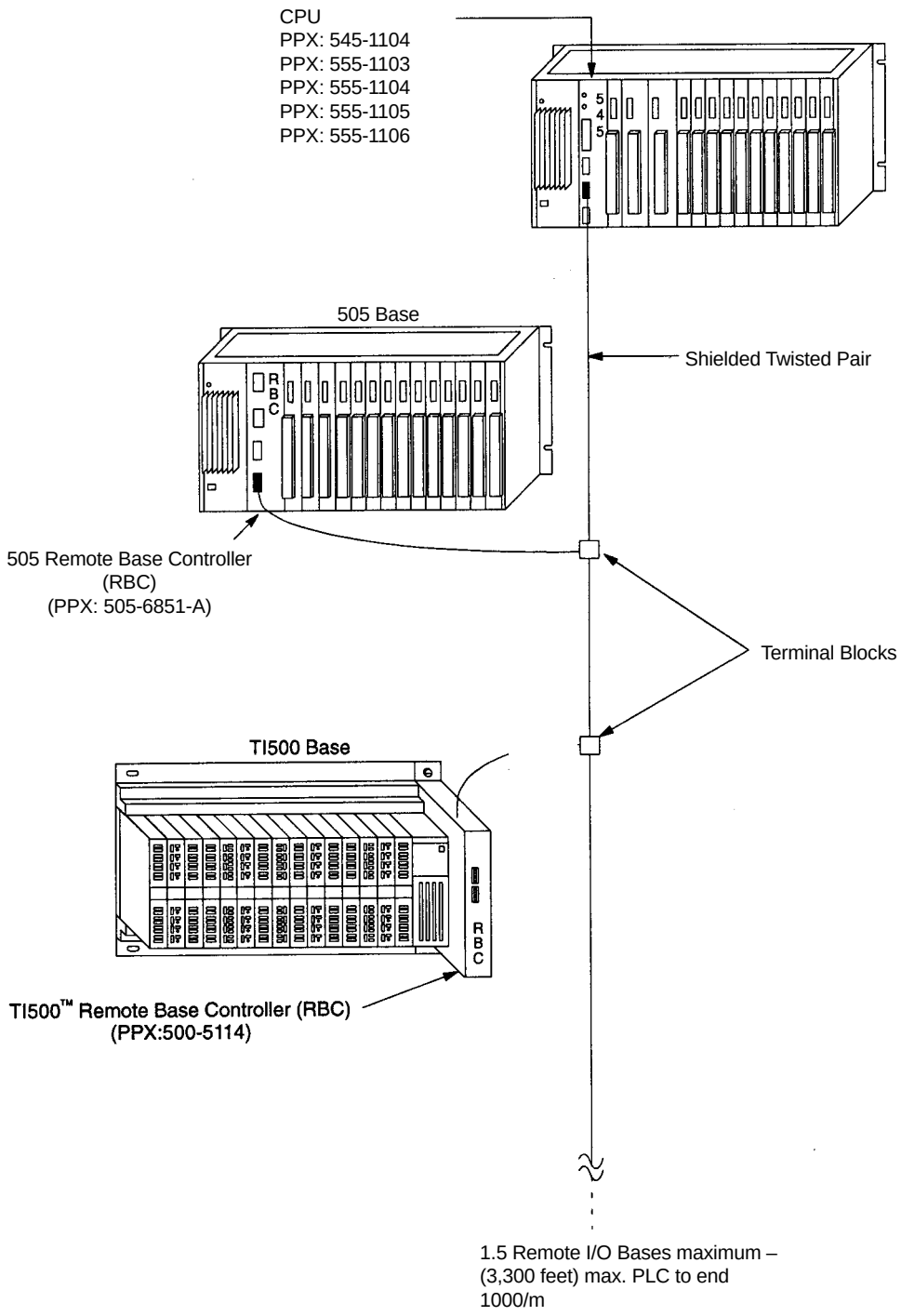

I/O Modules
Power Supply
110/220 VAC
(PPX: 505-6660)
24 VDC (PPX: 505-6663)
CPU
SIMATIC 525 (PPX: 525-1102)
(PPX: 525-1104)
SIMATIC 535 (PPX: 535-1212)
SIMATIC 545 (PPX: 545-1103)
(PPX: 545-1104)
SIMATIC 555 (PPX: 555-1105)
(PPX: 555-1106)
I/O Base
4 Slot (PPX: 505-6504)
8 Slot (PPX: 505-6508)
16 Slot (PPX: 505-6516)

A



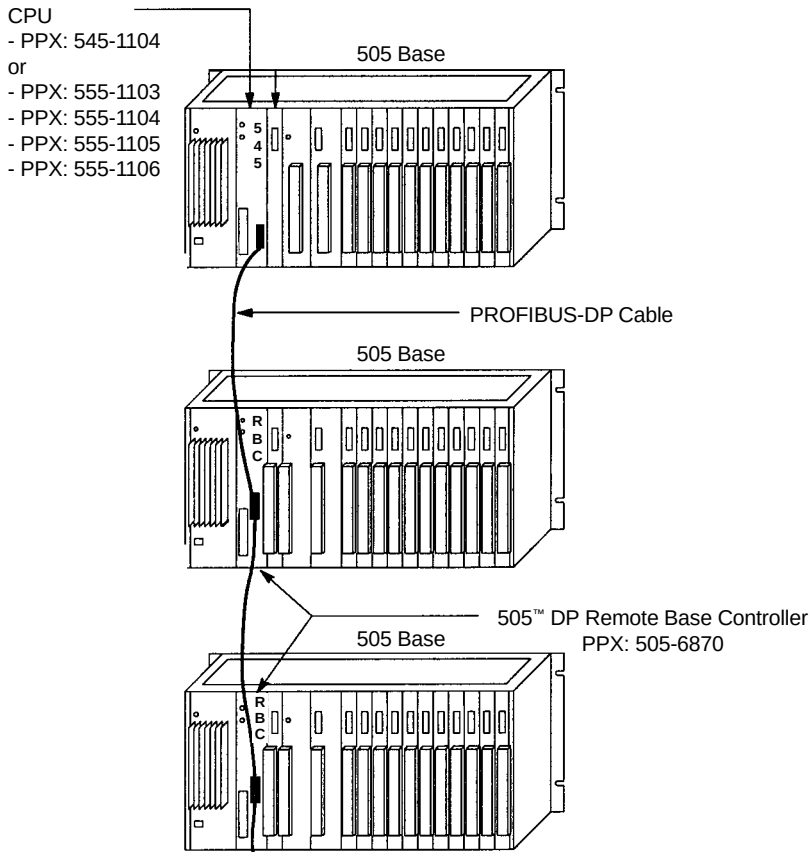
NOTE: The part numbers in this illustration are piece-part and/or spare part numbers for a complete or partial system. Refer to the price list section for the available complete or partial system packages.

A



NOTE: The part numbers in this illustration are piece-part and/or spare part numbers for a complete or partial system. Refer to the price list section for the available complete or partial system packages.

A



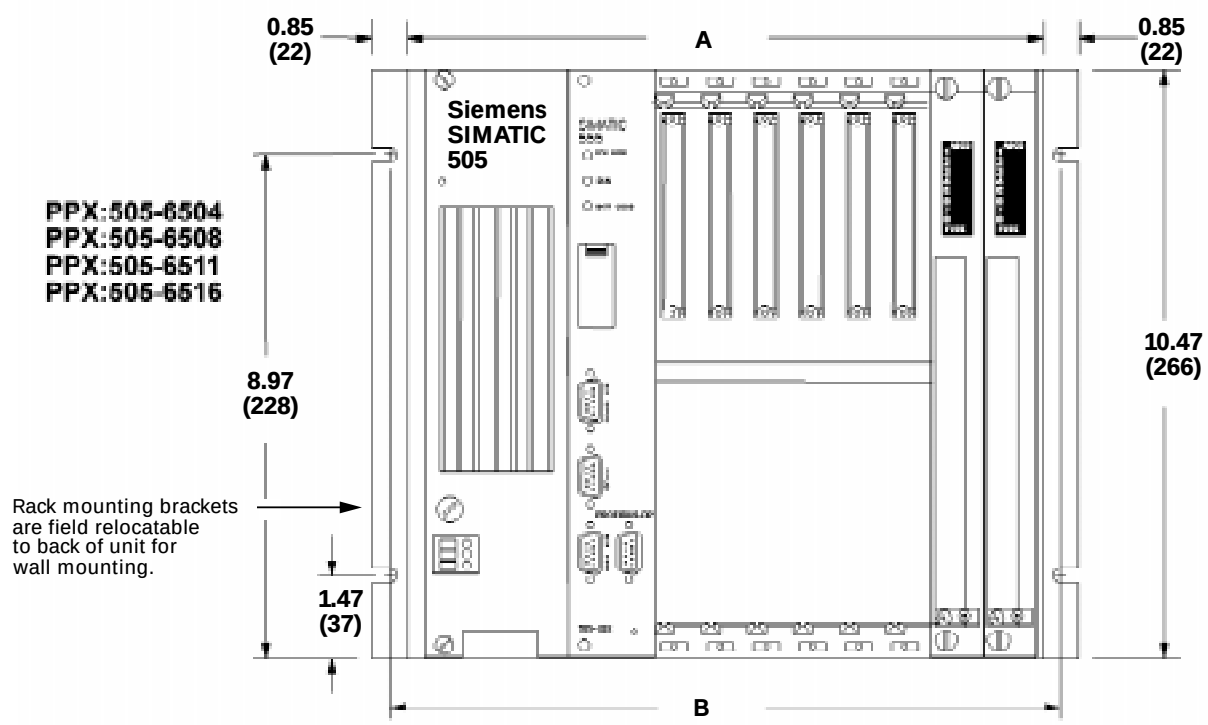
112 Remote I/O Bases maximum –
100 meters maximum PLC to End (12 Mbaud)\1200 meters maximum PLC to End (9.6 Kbaud)

NOTE: The part numbers in this illustration are piece-part and/or spare part numbers for a complete or partial system. Refer to the price list section for the available complete or partial system packages.

A

Installing 505/575 system hardware

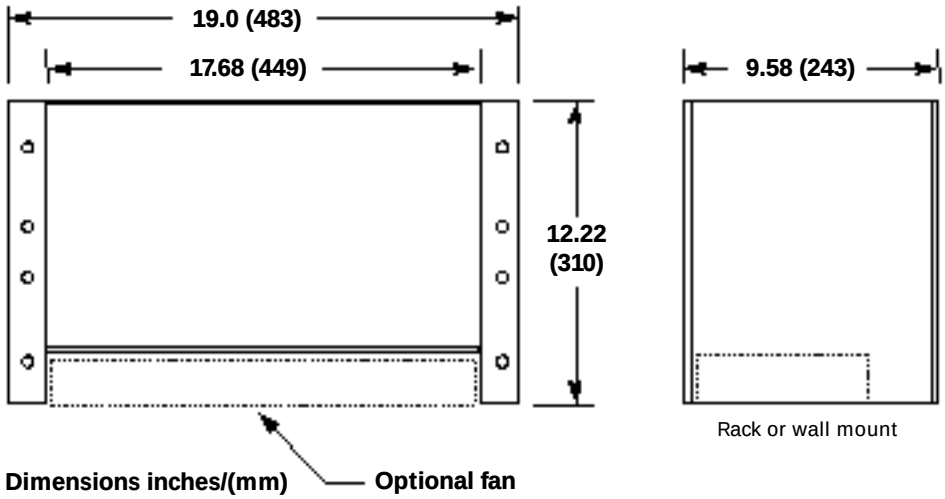
505 System Chassis



Dimensions inches/(mm)

Base PPX:	Dimensions A inches/(mm)	Dimensions B inches/(mm)
505-6504	8.10 (206)	8.69 (221)
505-6508	11.29 (287)	11.93 (303)
505-6511	17.70 (450)	18.34 (466)
505-6516	17.70 (450)	18.34 (466)

575 System Chassis



Dimensions inches/(mm)

Mechanical outline diagram shows the physical dimensions of the PPX: 575-2130 VMEbus base.
This base is designed to be mounted and operated in the horizontal orientation only.

A

C.E. Marks

B

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C.E. Marks

Background

As one of the principal elements of their internal market program, the European Union (EU) is creating harmonized, European-wide standards in key product sectors which will replace divergent national standards.

For standards purposes, there are two classes of products in the EU, “regulated” and “unregulated.” Products which are subject to these new harmonized standards are referred to as regulated products.

For regulated products, the EU has set out the guidelines for harmonized European-wide standards in a number of directives, commonly known as “new approach directives,” which center on the health and safety aspects of these products.

The new approach directives are not standards. They are government mandated essential requirements. Standards are developed from the new approach directives by three European regional standards organizations:

CEN
(European Committee for Standardization)

CENELEC
(European Committee for Electrotechnical Standardization)

ETSI
(European Telecommunication Standards Institute)

These bodies have stated their intention to adopt and implement existing international standards of the ISO and IEC wherever possible.

To date, numerous new approach directives have been fully adopted covering such diverse areas as toys, machinery, construction products, and medical devices.

New approach directives require the affixing of the CE (Conformite’ Europeenne) indicating that the product has met all legal requirements of pertinent EU legislation.

Of the existing EC new approach directives, there are two which are important to PLC products, and one that is incidental:

Electromagnetic Compatability

(12/31/95)

Low Voltage
(12/31/96)

Machinery
(12/31/94) - Incidental

Product covered by the new approach directives cannot be sold into the EU without the CE mark after the implementation dates listed above.

B

*Available soon

EC Regulation 89/336/EEC Commonly known as the EMC Directive:

Products which have the CE-marking meet the requirements of the EC-regulations 89/336/EEC "Elektromagnetische Vertaeglichkeit" (Electomagnetic Immunity).

The SIMATIC 505 products can be used in industrial applications since they meet the following requirements:

Note: Testing for EMC compliance was performed on a typical 505 system installation. The user may be required to take additional measures to insure that EMC emissions compliance is maintained in unusual situations or configurations.

Usage	Emissions	Immunity
Industrial	EN50081-2 : 1993	EN50082-2 : 1995

General Notes to the Manufacturer of Machines

Electrical Equipment of Machines Corresponding to EN 60204 (as Referred to by 89/392/ECC) commonly known as the Machinery Directive:

The SIMATIC 505 automation system is not a machine in the sense of the EC regulations for machines.

That's why there is no declaration of conformity concerning the EC regulations for machines 89/392/ECC. However, when used to automate a machine, The SIMATIC 505 is part of the electronic equipment of the machine and, therefore, must meet minimum standards. The 505 equipment complies with 73/23/EEC which is The Council Directive relating to electrical equipment designed for use within certain limits (Low Voltage Guideline).

The EN 60204-1 (Safety of machines, general requirement) applies to electrical equipment on machines.

The following is provided to help clarify which of the EN 60204-1 criterion apply to SIMATIC 505 and how it complies.

EN 60204-1	Subject/Criterion	Comment
Paragraph 4	General Requirements	Meets all requirements, if installed/mounted as installation instructions prescribe.
Paragraph 11.2	Digital input/output interface	Meets all requirements.
Paragraph 12.3	Programmamble controls	Meets all requirements if it is installed in a lockable cabinet so that unauthorized persons cannot make changes to the memory.
Paragraph 20.4	Voltage tests	Meets all requirements.

B

Our Services	**Advice** On all questions	**Maintenance** Preventative maintenance Inspection Repair	**Support** We help you to help yourself Telephone hotline to our specialists Supply of all necessary utilities User support for configuration, start-up, introduction phase, etc.	**Stand-by Service** Service schedule according to needs Round-the-clock service 365 days a year Fast response	**Spare Parts** High-speed delivery service worldwide Specialist repair service Spare parts management Central spare parts service	**Modernization** Competent advice for modernization Preparation and integration of upgrade and alteration packages Functionality expansion
Your Advantages	**Advice** Competent assistance from a single source Reduced personnel costs Minimized training times	**Maintenance** Increased fault-tolerance Easy maintenance budgeting	**Support** Fast information service Access to our worldwide intrastructure On-site training for your personnel	**Stand-by Service** Service during your operating hours Less downtime Reduced personnel costs	**Spare Parts** Reduced spare parts stocking costs Less downtime	**Modernization** Repairability Access to the latest technology

The rigor of everyday industrial life places high demands on equipment, especially on complex products and systems. Through painstaking care and attention, they can be made to run faultlessly, day after day, month after month. But failures can never be ruled out completely.

When this happens, you may find yourself out on your own. On the other hand, you may receive prompt support - maybe you will even be able to eliminate the fault before it leads to a stoppage.

With Siemens, you always have the right partner. We can support you in all matters relating to automation.

You can rely on us for know-how, at the highest level, up-to-date and close-at-hand.

With us, service means a lot more than just repair. We provide support for all Siemens automation products, systems, and large-scale plants, such as SIMATIC and SIMATIC NET.

We also offer you advice and support, stand-by services, help you to expand your plant, provide maintenance, supply spare parts, and modernize your equipment.

Our service range is modular in design, with each module complementing the next, right up to the total solution. This means less risk for you, and you don't have to pay for services that you don't even need. Our aim is to keep you satisfied and allow you to get the best from your investments in automation.

We have built up an experienced team for exactly this purpose, with 5700 service personnel around the world.

Your local Siemens sales office will be happy to answer any of your queries.

In the United States call 1-800-964-4114 to be directed to the sales office nearest you.

For technical assistance in the United States call 423-461-2522 outside the U.S. call 49-911-895-7000

B

The information given below is of a predominantly fundamental nature and applies regardless of the type of SIMATIC electronic control system.

Reliability

The reliability of SIMATIC programmable controllers and components is increased to a high level by taking the following extensive and cost-intensive measures during development and manufacture:

- Use of high-quality components
- Worst-case design of all circuits
- Systematic and computer-controlled testing of components supplied by subcontractors
- Burn-in of LSI circuits (e.g. processors, memories, etc.)
- Measures to prevent static charge from building up when handling ESD sensitive circuits
- Visual checks at key stages of manufacture
- In-circuit testing of all modules, i.e. computer-aided testing of components and their interaction with other components in the complete circuit
- Continuous heat-run test at elevated ambient temperature over a period of several days
- Careful computer-controlled final testing
- Statistical evaluation of failures during testing to enable the immediate initiation of suitable corrective measures
- Monitoring of the major controller components through on-line tests (parity checking in RAM, watchdog for the CPU, etc.)

These basic safety requirements are sufficient to avoid or overcome the majority of possible faults.

Hazard Risk

In all cases where the occurrence of faults can result in personal injury or material damage, special measures must be taken to ensure the safety of equipment and its use. Special regulations relating to equipment exist for these types of applications, and they must be observed when designing a control system. Wherever electronic control systems have a responsibility to ensure safety, the measures necessary to avoid or overcome faults are determined from the risk presented by the equipment. This means that beyond a certain level of danger, the basic safety measures listed above are no longer sufficient. Additional measures (such as dual-channel control, tests, check sums, etc.) must be implemented for the controller and a certificate of approval obtained.

Distinction between safety areas and non-safety areas

Almost all plants contain components which perform safety tasks (e.g. emergency-off switch, safety guards, two-hand controls). In order to avoid treating the entire control system as a high safety risk, a distinction is generally made between a safety area and a non-safety area. In the non-safety area, no special demands are made of controllers, since the failure of electronic components does not endanger the plant nor personnel. In the safety area, however, only controllers or circuits which meet the relevant regulations can be used.

The following distinctions are generally made in practice:

1. Controllers with few safety features (e.g. machine controls)
   - The programmable controller takes over the function of machine controller, while the safety requirements are implemented by conventional non-electronic means.
2. Controllers for applications with a balance of safety and non-safety requirements (e.g. chemical plants, cable cars)
   - The non-safety area is served by standard programmable controllers, the safety area by tested fail-safe programmable controllers.
   - The entire plant is served by tested fail-safe programmable controllers.
3. Controllers for predominantly high-risk equipment (such as furnaces)
   - The entire control system uses fail-safe technology.

Important note

Even where a high degree of safety has been built into an electronic control system with, for example, multi-channel design, it is nevertheless of utmost importance that the guidelines in the operating instructions be strictly adhered to, since the failure to do so may either hinder existing safety precautions or create additional hazards.

Agency Approvals

The SIMATIC 505 is designed to meet both domestic and international standards. An overview follows:

Agency Approvals (All controller models and power supply)	UL Listed (industrial control equipment) CSA Certified (process control equipment)[1] FM approved (Class I, Div. 2, Haz. Loc.) UL Canada Listed[2]

[1]Except 505-2555, 2580, 2590, 2571, 2556, 2557, 2572
[2]Applies to 505-2555, 2580, 2590, 2571, 2572, 2556, 2557

In addition, the system complies with applicable requirements of Verband Deutscher Elektrotechniker (VDE) 0160: Electrical Equipment, except 220 VAC Input Modules (No. PPX:505-44XX).

Series 505 products have been developed with consideration of the standards for programmable controllers as described in EN61131-2 Programmable Controllers

Part 2: Equipment Requirements and Tests, 1995 Information concerning product reliability and compliance to the IEC or other standards can be provided upon request. Contact your Siemens Energy & Automation, Inc., distributor.

If you need assistance in contacting your distributor, call (800) 964-4114; or write to the Customer Services Center at the following address:

Siemens Energy & Automation, Incorporated
3000 Bill Garland Road
P.O. Box 1255
Johnson City, TN 37605-1255

Attention:
Customer Service Center

B

Physical and Environmental Specifications

Table B-1 Physical and Environmental Specifications

Models	PPX:545-1103 CPU PPX:545-1104 CPU PPX:555-1103 CPU PPX:555-1104 CPU PPX:555-1105 CPU PPX:555-1106 CPU PPX:575-2104 CPU PPX:575-2105 CPU PPX:575-2106 CPU PPX:505-6850-A Coax, Dual Media RBC PPX:505-6851-A RS-485, Dual Media RBC PPX:505-6870 505 PROFIBUS DP RBC
Operating temperature	0 to 60° C (32 to 140° F)
Storage temperature	-40 to +70° C (-40 to 158° F)
Relative humidity	5% to 95% noncondensing
Pollution degree	2, IEC 664, 664A
Vibration	Sinusoidal IEC 68-2-6, Test Fc 0.15mm peak-to-peak, 10-57 Hz; 1.0g, 57-150 Hz Random IEC 68-2-34, Test Fdc NAVMAT P-9492 or IEC 68-2-34, Test Fdc with 0.04 g^2/Hz, 80-350 Hz, and 3 dB/octave rolloff, 80-20 Hz and 350-2000 Hz at 10 min/axis
Impact Shock	IEC, 68-2-27, Test Ea; Half sine, 15g 11ms
Isolation, inputs to controller	1500 Vrms except where specified
Corrosion protection	All parts of corrosion-resistant material or plated or painted as corrosion protection
Electric Noise Immunity	
Conducted noise:	IEC 801, Part 4, Level 3 MIL-STD-461B, Part 4, CS01, CS02, CS06 IEC 255-4, Appendix C EEC 4517/79 Com(78) 766 Final, Part 4 IEEE 472, 2.5 kV
Radiated noise:	IEC 801 Part 3, Level 3 MIL-STD-461B, Part 4, RS01, RS02
Electrostatic discharge:	IEC 801, Part 2, Level 4 (15 kV)

B

Conditions of Sale and Delivery

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Any export requires approval by responsible authorities.

Information thereon can be obtained from our acknowledgments, delivery notes and invoices.

The Automation Group's General Conditions for the Use of Software Products Against Once-Only Payment shall apply to all software products.

The technical data, dimensions and weights are subject to change unless otherwise stated on the individual pages of this catalog.

The illustrations are for reference only.

We reserve the right to adjust the prices and shall charge the prices applying on the date of delivery.

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